

University of Washington Bulletin GENERAL CATALOG 1974-76

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# UNIVERSITY OF WASHINGTON

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# ACADEMIC CALENDAR 1974/75

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

# SPRING QUARTER 1974

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

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

# SUMMER QUARTER 1974

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

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

# AUTUMN QUARTER 1974

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

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

# WINTER QUARTER 1975

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

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

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

# 1975/76

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

# SPRING QUARTER 1975

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

New graduate students				January 1
All other new and former	students			February 1*
Classes begin		e Alexandre e de la composición de la comp		March 31
Memorial Day holiday			· ·	May 30
Last day of instruction	. ,	• •		June 6
Final examinations				June 9–13
Commencement	•		· · ·	June 14
-				

# SUMMER QUARTER 1975

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

		April 1
		May 15
		June 23
		July 4
		July 23
		July 24
•	. ·	August 22

# AUTUMN QUARTER 1975

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

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

# WINTER QUARTER 1976

To assure consideration, completed admission applications must be<br/>received by the following closing dates:New graduate studentsOctober 1All other new and former studentsNovember 1\*Classes beginJanuary 5Washington's Birthday holidayFebruary 16Last day of instructionMarch 12Final examinationsMarch 15–19

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





The University, through its teaching and research programs and through its faculty, students, and staff, is a major force for change. And yet it must also remain a stabilizing force in our society—a preserver of many valuable aspects of our culture. It is at once radical and conservative. The University serves societal needs through all of its activities, although teaching and community service tend to serve more immediate goals while research may largely benefit future generations.

> John R. Hogness President





# GENERAL INFORMATION

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

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

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

The majority of students who enter the University as freshmen are from the top one-third to one-fifth of their

high school graduating class. The grade-point average for the freshman class entering in Autumn Quarter 1973 was 3.25.

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

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

#### The Faculty

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

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

#### Accreditation

The University of Washington is accredited by the Northwest Association of Secondary and Higher Schools and is a member of the Association of American Universities. Individual schools and colleges are members of the various accrediting associations in their respective fields.

# PROGRAMS OF STUDY

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

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

#### **College of Architecture and Urban Planning**

Architecture Building Construction Landscape Architecture Urban Planning

#### **College of Arts and Sciences**

\*African Studies

- \*American Indian Studies
- \*American Studies
- Anthropology

Art

\*Asian American Studies Asian Languages and Literature Astronomy Atmospheric Sciences

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

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

#### **School of Dentistry**

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

#### **College of Education**

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

#### **College of Engineering**

Aeronautics and Astronautics Bioengineering Chemical Engineering Civil Engineering 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

**School of Law** 

#### \*\*School of Librarianship

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

#### **School of Nursing**

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

School of Pharmacy Pharmaceutical Sciences Pharmacy Practice

#### **\*\*Graduate School of Public Affairs** Public Administration Public Policy

\*\* Graduate degrees only. Certain courses open to undergraduates.

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#### School of Public Health and Community Medicine

Biostatistics Environmental Health Epidemiology and International Health Health Services Pathobiology

#### **Reserve Officer Training Programs**

Aerospace Studies Military Science Naval Science

#### School of Social Work Social Welfare

#### **Graduate School**

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

**†Aeronautics and Astronautics †Anthropology** Architecture Art **†Art History** †Asian Languages and Literature †Astronomy **†**Atmospheric Sciences †Biochemistry **†Biological** Structure **Biology †Biomathematics Biomedical History** †Botany †Business Administration **†Ceramic Engineering †Chemical Engineering †Chemistry †Civil Engineering †Classics †Communications** <sup>†</sup>Comparative Literature **†Computer Science** Dentistry Drama †Drama Arts **East Asian Studies** †Economics †Education **†Electrical Engineering** 

†English †Epidemiology and International Health **†Fisheries †Forest Resources** †Genetics †Geography **†Geological Sciences †Geophysics** †Germanic Languages and Literature Health Services Administration and Planning †History Home Economics Inter-Engineering †Law Librarianship **†Linguistics** †Mathematics <sup>†</sup>Mechanical Engineering <sup>†</sup>Metallurgical Engineering †Microbiology Mining, Metallurgical, and Ceramic Engineering †Music Near Eastern Languages and Literature <sup>†</sup>Nuclear Engineering Nursing †Oceanography **†Oral Biology** <sup>†</sup>Pathology **†Pharmaceutical Sciences †Pharmacology Pharmacy Practice** †Philosophy **Physical and Health Education †Physics** <sup>†</sup>Physiology and Biophysics †Physiology Psychology **†Political Science** †Psychology **Public Affairs** Public Health and Community Medicine **Radiological Sciences Rehabilitation Medicine** <sup>†</sup>Romance Languages and Literature **Russian and East European Studies** <sup>†</sup>Scandinavian Languages and Literature †Slavic Languages and Literature Social Work **†Sociology** †Special Individual Ph.D. Program †Speech **†Urban Planning** <sup>†</sup>Zoology

\*\* Graduate degrees only. Certain courses open to undergraduates. † Doctoral program.

#### GENERAL INFORMATION



# 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**

#### **Graduate Degrees**

Master of ArtsM.A.Master of Arts for TeachersM.A.T.Master of ScienceM.A.T.Master of Science in Aeronautics andAstronauticsM.S.A.&A.Master of Science in Ceramic EngineeringM.S.Cer.E.Master of Science in Chemical EngineeringM.S.Ch.E.Master of Science in Civil EngineeringM.S.C.E.Master of Science in DentistryM.S.Ch.E.Master of Science in Electrical EngineeringM.S.C.E.Master of Science in Belectrical EngineeringM.S.E.E.Master of Science in EngineeringM.S.E.Master of Science in MathematicalM.S.Math.Stat.

Master of Science in Mechanical Engineering M.S.M.E.
Master of Science in Metallurgical
Engineering M.S.Met.E.
Master of Science in Nuclear Engineering M.S.N.E.
Master of Science in Physical Education. M.S.Phys.Ed.
Master of Science in Public Health M.S.P.H.
Master of Science in Radiological
Sciences M.S.Rad.Sci.
Master of Aeronautics and Astronautics M.A.&A.
Master of Architecture
Master of Business Administration M.B.A.
Master of Communications
Master of Education M.Ed.
Master of Fine Arts M.F.A.
Master of Forest Resources M.F.R.
Master of Health Administration M.Health Admin.
Master of Laws L.L.M.
Master of Law Librarianship M.LawLibr.
Master of Librarianship M.Libr.
Master of Music
Master of Nursing M.N.
Master of Occupational Therapy M.O.T.
Master of Physical Therapy M.P.T.
Master of Public Administration M.P.A.
Master of Public Health M.P.H.
Master of Public Health M.P.H. Master of Social Work
Master of Public Health M.P.H. Master of Social Work M.S.W. Master of Speech Pathology and
Master of Public Health M.P.H. Master of Social Work M.S.W. Master of Speech Pathology and Audiology M.Sp.Path.&Aud.
Master of Public Health M.P.H. Master of Social Work M.S.W. Master of Speech Pathology and Audiology M.Sp.Path.&Aud. Master of Urban Planning M.U.P.
Master of Public HealthM.P.H.Master of Social WorkM.S.W.Master of Speech Pathology andAudiologyM.S.P.Path.&Aud.Master of Urban PlanningM.U.P.Doctor of ArtsD.A.
Master of Public HealthM.P.H.Master of Social WorkM.S.W.Master of Speech Pathology andAudiologyM.S.Path.&Aud.Master of Urban PlanningM.U.P.Doctor of ArtsD.A.Doctor of EducationEd.D.
Master of Public HealthM.P.H.Master of Social WorkM.S.W.Master of Speech Pathology andAudiologyM.S.Path.&Aud.Master of Urban PlanningM.U.P.Doctor of ArtsD.A.Doctor of EducationEd.D.Doctor of Musical ArtsD.M.A.
Master of Public HealthM.P.H.Master of Social WorkM.S.W.Master of Speech Pathology andAudiologyM.S.Path.&Aud.Master of Urban PlanningM.U.P.Doctor of ArtsD.A.Doctor of EducationEd.D.Doctor of Musical ArtsD.M.A.Doctor of PhilosophyPh.D.

#### Dental, Law, and Medical Degrees

Doctor of Dental Su	rg	er	y			•	•	•		•	•	•	•	•		D.D.S.
Juris Doctor	•		•		•	•	•		•	•			•	•	•	J.D.
Doctor of Medicine	•	•	•	•	•	•		•	•	•.	•	•	•	•	•	M.D.

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

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

#### SESSIONS

University instruction is offered during three quarters of approximately eleven weeks each during the Autumn, Winter, and Spring quarters, and for nine weeks during the Summer Quarter. Autumn Quarter begins in September and ends before the Christmas holidays; Winter Quarter continues from early January until the third week in March; and Spring Quarter extends from late March until the middle of June.

Summer Quarter extends from mid-June to mid-August, with some courses being offered in either the first half (term a) or the second half (term b).

#### Summer Quarter

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

Admission requirements for Summer Quarter are the same as for any other quarter, and credits earned are evaluated as residence credits. Application closing dates should be carefully observed. Summer Quarter fees closely parallel those of a regular quarter; there is no additional fee for nonresidents during the summer. A separate fee schedule applies to medical and dental students.

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

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

# THE CAMPUS

The University of Washington's campus—680 acres of trees, landscape, and buildings in urban Seattle—is situ-

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

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

#### **University Libraries**

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

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

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

Most books in the Suzzallo Library and in the branch libraries are in open-shelf collections, to which students have direct access. Librarians assigned to each collection or service unit assist students in the locating and using of materials.



The specialized collections in the branch libraries are useful for work in various disciplines and are situated near the classrooms and laboratories of each discipline. Branch libraries in the sciences include Chemistry-Pharmacy, Engineering, Fisheries-Oceanography, Forest Resources, Health Sciences, Mathematics Research, and Physics. Libraries in other disciplines include Architecture and Urban Planning, Art, Business Administration, Drama, Far Eastern Studies, Geography, Law, Music, Philosophy, Political Science, and Social Work.

The University of Washington Library system participates in many regional and national bibliographic enterprises. The Pacific Northwest Bibliographic Center, a library corporation, maintains in the Suzzallo Library a union card catalog of more than 3,750,000 author entries from forty libraries in the Pacific Northwest. This catalog is an aid to locating uncommon books in other library collections that may be required by library users, both on and off campus.

#### Museum

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

Graduate training in the museum includes a program that leads to a Master of Arts degree in anthropology, with a specialization in museology.

#### **University Theatres**

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

#### **Henry Art Gallery**

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

#### Ethnic Cultural Center

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

#### The Center for Asian Arts

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

## STUDENT HOUSING

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

#### **Residence Halls**

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

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

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

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

#### **University Housing for Married Students**

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

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

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

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

4. All other students.

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

#### **Privately Operated Accommodations**

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

#### **Fraternities and Sororities**

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

Fraternities and sororities are granted a broad degree of self-government. However, the University makes available, through the Office of Student Affairs, staff members to advise house leaders on all phases of chapter life and operation. Activities of the fraternities and sororities are coordinated and governed by the student Interfraternity Council and Panhellenic Association, respectively. These organizations also coordinate and supervise the rush programs for their member fraternities and sororities.

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

#### **Religious Living Groups**

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

#### **Special Living Groups**

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

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

# CAMPUS ACTIVITIES

#### **Recreational Sports**

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

#### **Intramural Activities Building**

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

#### **Golf Range**

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

#### **Canoe House**

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

#### Student Union Building (HUB)

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



#### Hutchinson Hall

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

#### **Edmundson Pavilion**

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

#### **Conibear Crew House**

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

#### **Intramural Sports**

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

#### **Sports Clubs**

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

#### **Intercollegiate Sports**

#### Women

The intercollegiate athletic program for women offers nine sports for undergraduate students: basketball, crew, field hockey, gymnastics, golf, swimming, tennis, track, and volleyball. Competition is scheduled within the Northwest College Women's Sports Association. Qualifying teams and individuals also compete in the national championships of the Association for Intercollegiate Athletics for Women.

#### Men

The intercollegiate athletic program for men offers competition in twelve varsity sports for undergraduate students. Some six hundred athletes participate annually in baseball, basketball, crew, cross-country, football, golf, gymnastics, soccer, swimming, tennis, track, and wrestling. Competition is scheduled with the other member schools of the Pacific-8 Conference, as well as with other institutions inside and outside the state. The wellrounded program emphasizes both scholarship and aggressive competition in athletics.

#### **Lectures and Concerts**

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

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

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

#### Drama

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

#### Music

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

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

#### **Readers Theatre**

The Department of Speech presents Readers Theatre programs twice each quarter of the academic year. Di-

rected by faculty and selected graduate students, these public programs feature outstanding works of literature performed by advanced oral interpretation students. Readers Theatre is open to all undergraduates interested in group oral interpretation performance. Permission to enroll in the course is obtained from the director of Readers Theatre.

#### **Forensic Studies**

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

#### **Religious Activities**

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

#### **Student Government**

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

#### **ASUW Commissions**

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

Women's Commission: All areas of women's rights, particularly within the University community, are the

focus of the Women's Commission. In the past, activities have focused on all aspects of discrimination against women among students, faculty, and staff. A primary task of the commission is educational activity involving lectures, symposia, publications, and consultative services for women students.

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

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

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

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

#### **Other ASUW Activities**

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

#### Graduate and Professional Student Senate

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



#### **Student Activities Office**

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

#### **Student Organizations**

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

#### **Student Publications**

Student publications at the University of Washington include the *Daily* and the *Student Directory*. The *Daily* is published Tuesday through Friday mornings throughout the academic year and is distributed on campus without charge. During Summer Quarter, the *Daily* is published once a week. Any student with an interest in journalism may serve on the *Daily* staff.

# STUDENT SERVICES

#### Academic Advising

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

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

The extent to which students should use advisory services becomes a matter of individual need. Many departments require students to have periodic reviews of their academic programs with advisers, but usually the use of such services depends upon individual interest and concern about one's educational development. Students find that advisory services, both formal and informal, are available, once sought.

#### **Office of Student Affairs**

The Office of Student Affairs is concerned with the general welfare of students in their extracurricular life and activities and provides various nonacademic services to assist them. It welcomes correspondence and conferences with both parents and students. The office works closely with the advisers of the colleges and schools, the Counseling Center, and other agencies to provide assistance with personal, social, and adjustment problems that may influence a student's academic performance.

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

#### **Office of International Services**

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

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

#### **Foreign Study**

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

The Department of Germanic Languages and Literature offers a program of summer language study in Berlin

and Marburg, Germany. Excursions and attendance at musical and theatrical performances supplement the academic program, and home stays are provided.

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

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

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

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

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

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

#### **Counseling Center**

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

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

### **Educational Assessment Center**

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

#### **Health Services**

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

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

A thirty-five-bed hospital unit operates from about September 15 through June 15; night emergency service is also available during the regular school year.

No charge is made for professional services obtained through the Student Health Service. However, students must pay certain fees: \$2 per day for hospital confinement, \$1 per injection for allergy shots, and \$2 per immunization for personal travel shots. Students also

#### **GENERAL INFORMATION**



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

#### **Placement Center**

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

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

• to develop effective job-seeking campaigns.

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

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

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

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

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

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

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

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

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

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

#### Office of Student Financial Aid

University students faced with serious financial problems should inquire about assistance at the Office of Student Financial Aid, 105 Schmitz. The primary purpose of the financial aid program is to provide financial assistance to students who, without such assistance, would find it impossible or difficult to enter or remain at the University. Another important purpose is to provide financial assistance to students experiencing acute, temporary financial emergencies.

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

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

The Office of Student Employment, 105 Schmitz, lists many part-time, temporary, and summer jobs available both on and off campus to University students and their spouses. A student may make application *only in person* after he or she is enrolled, or in the process of enrolling, with matriculated standing at the University.

#### Parking

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

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

#### **University Book Store**

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

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

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



# RULES AND REGULATIONS

The University and its colleges and schools reserve the right to change the fees, the rules, and the calendar regulating admission and registration, the instruction in, and the graduation from, the University and its various divisions, and to change any other regulations affecting the student. Changes go into force whenever the proper authorities so determine, and apply not only to prospective students but also to those who at that time are matriculated in the University. The University also reserves the right to withdraw courses at any time.

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

# DEFINITIONS OF GENERAL UNIVERSITY TERMS

#### College

The University is made up of six colleges, each of which offers a curriculum (i.e., sequence of courses) leading to the Bachelor of Arts or Bachelor of Science degree. A college may include many schools, departments, and divisions. For example, the College of Arts and Sciences includes six schools, twenty-four departments, and several divisions.

#### School

Within the University are two types of schools, independent units (e.g., Business Administration, Dentistry, Law, Medicine, Nursing, Pharmacy, Public Health and Community Medicine, and Social Work), which offer professional training to students who may be required to complete a period of preprofessional study, and units within colleges, which offer semiprofessional training in single fields of study (e.g., Art, Communications, Drama, Home Economics, Music, and Physical and Health Education).

The Graduate School coordinates the work of students who already have obtained a baccalaureate degree and have been admitted to the school for advanced work toward the master's or doctoral degree.

#### Department

The unit of instructional organization in a particular science or art is called a department (e.g., History). The department differs from the semiprofessional school in its tendency to place less emphasis on the application of subject matter.

#### Division

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

#### Institute

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

#### Course

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

#### **Hyphenated Course**

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

#### **Prerequisites**

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

#### Credit

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

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

There are three basic types of credit:

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

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

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

#### Curriculum

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

#### **Lower-Division Courses**

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

#### **Upper-Division Courses**

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

#### **Graduate Courses**

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

#### Premajor

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

#### Major

A major indicates the particular curriculum that a student has selected to follow toward a degree. The term

#### RULES AND REGULATIONS



"nonmajor," which frequently appears in descriptions of courses, indicates a course designed primarily for students who are not specializing in that subject.

#### Adviser

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

#### Bulletin

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

#### **Resident, Washington State Residency**

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

# DEFINITIONS OF STUDENT CLASSIFICATIONS

#### Classes

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

Freshman: 1-44 quarter credits.

Sophomore: 45–89 quarter credits.

Junior: 90-134 quarter credits.

Senior: 135–180 or more quarter credits.

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

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

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

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

#### Definitions

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

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

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

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

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

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

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

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

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

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

10. A full-time undergraduate student is one who is carrying at least 12 academic credits. A graduate stu-

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

# UNDERGRADUATE ADMISSION

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

The Board of Admissions, Scholastic Standards, and Graduation has been authorized to interpret and administer undergraduate admission regulations established by University faculties. In general, admissibility is determined according to the applicant's scholastic standing, admission test scores, and the adequacy of preparation for University study while in high school or another collegiate institution, with preference given, as necessary, to those with the greater probability of success in completing a degree program. In the event that there are more qualified applicants than can be accommodated, priority is given to those students offering the highest admission qualifications. Special consideration is given to the applicant's choice of curriculum and the availability of space at the proposed level of entrance.

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

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

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

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

#### **Entrance Examinations**

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

#### Allowance of Transfer Credits

1. The University of Washington reserves the right to accept or reject credits earned at other collegiate institutions. In general, it is the University's policy to accept credits earned at institutions fully accredited by their respective regional accrediting associations, provided that such credits have been acquired through the university-level courses appropriate to the student's degree curriculum at the University of Washington.

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

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

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

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

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

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

7. Credit acquired through procedures described in paragraphs 4, 5, and 6 is included in the 90 maximum extension credits allowed toward the baccalaureate degree.

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

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

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

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

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

#### **In-person Registration**

In-person registration occurs just prior to the beginning of the quarter and is intended primarily to accommodate new and returning students. Students are provided appointment dates to register and may be scheduled either manually or on a computer in the same manner as that described for preregistration. Completed programs are not mailed, but must be picked up by the student,

#### **Fee Payment**

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

#### Late Registration

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

#### **Addresses of Students**

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

#### **Change of Program to Drop or Add Classes**

1. Preregistered students with appointments may change their programs during an early change period before the quarter begins. Information on dates and procedures appears on posters conspicuously placed throughout the campus.

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

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

4. The following procedures apply:

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

b. A student who drops one or more courses may qualify for a lower level of fees, depending on the number of credits the student continues to carry. If the change is made during the official change period, fees are assessed at the lower rate. If the change is made after the official change period and through the thirtieth calendar day of the quarter, half the difference between the two categories is assessed in addition to the lower tuition rate. If the change is made after the thirtieth calendar day of the quarter, the amount of tuition and fees owed is not reduced.

#### RULES AND REGULATIONS



c. After the official change period, a service charge of \$5 is assessed for each change of program, change of section, drop from a course, or any number of changes that are made to a program at the same time.

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

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

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

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

#### Withdrawal From the University

Once an eligible student turns in a registration form, he or she is considered to be registered and must officially withdraw if he or she later chooses not to attend. Official withdrawal must be made by the fifth day of the quarter for the student to avoid further financial obligation (see "Fee" section for refund schedule).

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

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

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

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

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

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

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

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

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

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

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

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

#### **Military Withdrawal**

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

# FULL-TIME REQUIREMENTS

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

#### **International Students**

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

1. An undergraduate, fifth-year, or nonmatriculated student must *earn* a minimum of 12 credits per quarter, excluding Summer Quarter.

2. A graduate student must *earn* a minimum of 9 credits per quarter, excluding Summer Quarter, during the time he or she is registered for graduate course work. Final determination of a full course of study for graduate students is made by the Dean of the Graduate School. The staff of the Graduate School consults with the student's graduate program adviser when appropriate.

3. A newly admitted international student may be advised by his or her academic adviser, because of inadequate skills or for similar academic reasons, not to register for a full course of study his or her *first quarter in the United States*. Such a student, therefore, is exempt from the 9- or 12-credit minimum the first quarter only, but must earn a minimum of 5 credits the *first* quarter. Such a student must provide the International Services Office with the written recommendation of the academic adviser before the end of the official change of registration period for his or her first quarter.

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

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

#### **Social Security Benefits**

A student who wishes to receive Social Security educational benefits must be enrolled as a full-time student in accordance with the general definition outlined above. A senior in his or her final quarter need register for only those credits required for graduation. Additional information may be obtained at the Registrar's Office, 209 Schmitz.

#### **Veterans' Benefits**

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

#### **Change of College or Major**

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

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

# GRADES AND GRADING SYSTEMS

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

- A Honor, 4 grade points per credit.
- B Good, 3 grade points per credit.
- C Medium/fair, 2 grade points per credit.
- D Poor (low pass), 1 grade point per credit.
- *E* Failure or unofficial withdrawal, 0 grade points per credit.
- N No grade. Used only for hyphenated courses and courses numbered 600, 700, and 800.
- I Incomplete. An incomplete is given only in case the student has been in attendance and has done satisfactory work until within two weeks of the end of the quarter and has furnished proof satisfactory to the instructor that the work cannot be completed because of illness or other circumstances beyond the student's control. To obtain credit for the course, a student must convert an incomplete into a passing grade not later than the last day of the student's next quarter in residence. This rule may be waived by the Dean of the college in which the course is offered only if the nature of the uncompleted work is such as to make impossible the fulfillment of this requirement. In no case is an incomplete converted into a passing grade after a lapse of two years or more. S
  - Satisfactory grade for courses taken on a satisfactory/not satisfactory basis. S grade is automatically converted from a letter grade of A, B, or Cin an undergraduate course and of A or B in a graduate course. An S grade may be awarded directly in a graduate course numbered 500 or above at the instructor's option.
- NS Not satisfactory. A grade conversion for students registered on a satisfactory/not satisfactory basis. D or E is not satisfactory in undergraduate courses, and C. D, or E is not satisfactory in graduate courses. NS is not included in the grade-point average calculation. An EW grade is converted to NS if the course is taken on a satisfactory/not satisfactory basis.

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- 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 letter grade if the student is in the credit/ no credit program. A grade of A, B, or C is converted to CR for these students.
- NC Credit not awarded in a course offered on a credit/no credit basis only. The course is not included in a grade-point calculation.
- *PW* Official withdrawal after the first fifteen calendar days of a quarter if the student's work is satisfactory at the time of withdrawal.
- *EW* Official withdrawal after the first fifteen calendar days of a quarter if the student's work is unsatisfactory at the time of withdrawal.
- X Grade not received from instructor.

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. Letter grades are weighted as follows in computing a grade-point average: A=4, B=3, C=2, D=1, E=0, and EW = 0. The number of credits is multiplied by the letter value of the grade to give the grade points 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 in the earned column on the permanent record. Not satisfactory grades, NS, do not count in the quarterly and cumulative grade-point averages.

On the quarterly grade report for students in the Graduate School, all courses numbered 100 through 800 with grades earned are listed. In computing a student's grade-point average, *letter system grades* are considered for 300-, 400-, and 500-level courses. *Letter system grades* for courses in the 100 and 200 series and courses numbered 600, 700, and 800 are excluded from the quarterly grade-point average but, with the exception of 100- and 200-level courses, are included in the credits earned column on the permanent record.

#### EXAMPLE 1: A TYPICAL GRADE REPORT

Autumn	Quarter	

	Credits		Grade
Course	Attempted	Grade	Points
English 171	3	CR (0)	= 0
Geology 101	5	B (3)	= 15
History 111	, 5 .	A (4)	= 20
Geography 258	2	<b>B</b> (3)	= 6
Total credits earned	15		
Total graded credits			
attempted (TCA)	12		41

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

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

# EXAMPLE 2: A FAILURE AND AN INCOMPLETE

Autumn Quarter

Credits		Grade	
Attempted	Grade	Points	
5	Ċ (2)	-	10
5	E (0)	` =	0
3	B (3)	=	9
) 2	Ι		
13	* 14 1		
		-	
13			19
	Credits Attempted 5 5 3 2 <u>2</u> 13 13	$\begin{array}{c} Credits \\ Attempted \\ 5 \\ 5 \\ 6 \\ 10 \\ 13 \\ \hline \\ 13 \\ \hline \\ C \\ C$	$\begin{array}{rcl} Credits & G\\ Attempted & Grade & Pe\\ 5 & C & (2) & =\\ 5 & E & (0) & =\\ 3 & B & (3) & =\\ 0 & \frac{2}{13} & I\\ 13 & & \\ \end{array}$

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

#### **Change of Grade**

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

#### **Grade Appeal Procedure**

A student who believes he or she has been improperly graded first discusses the matter with the instructor. If the student is not satisfied with the instructor's explanation, the student may submit a written appeal to the Chairman of the department, or in a nondepartmental college, to the Dean, with a copy of the appeal sent to the instructor. The Chairman, or Dean, consults with the instructor to ensure that the evaluation of the student's performance has not been arbitrary or capricious. Additionally, some colleges have grievance committees to consider grade disputes. Once a student submits a written appeal, this document and all subsequent actions on this appeal are recorded in written form for deposit in a department, or college, file.

#### **Grade Reports**

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

#### **Nontraditional Grading Options**

It should be noted that the possibility of future objective evaluation of the student's total academic record is reduced by the extent to which the record includes course work that is evaluated by a grading system other than the traditional A, B, C, D, or E. A student should be aware that he or she may, and probably will, jeopardize his or her future educational opportunities, particularly for graduate or postbaccalaureate study, when other systems of performance evaluation (e.g., satisfactory/not satisfactory or credit/no credit) are used.

#### Credit/No Credit Program

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

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

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

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

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

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

Satisfactory/Not Satisfactory: Participation in the credit/ no credit program does not affect a student's eligibility

#### RULES AND REGULATIONS



to take courses on a satisfactory/not satisfactory basis if he or she chooses to revert to the traditional grading system.

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

#### Credit/No Credit as a Course Option

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

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

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

#### Credit/No Credit as a Group Option

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

#### Satisfactory/Not Satisfactory Grading Option

Certain students are eligible to choose that a limited number of their credits be graded satisfactory/not satisfactory rather than with regular A, B, C, D, E grades. Any student who wishes to register for a course satisfactory/not satisfactory should check first with his or her adviser to determine restrictions and eligibility, because colleges and departments vary in their rules concerning this grading option. In no case is a student allowed to register for more than 6 credits (or for one course, if that course is offered for more than 6 credits) on a satisfactory/not satisfactory basis in a given quarter. No more than 25 satisfactory/not satisfactory credits are applied to an undergraduate degree. Under no circumstance may a student switch to or from satisfactory/not satisfactory grading for a particular course after the first week of the quarter.

#### Scholarship and Grades in the School of Dentistry

The School of Dentistry uses the University grade-point system: A=4, B=3, C=2, D=1, and E=0. The grade-point average is calculated by multiplying the grade points received in a course by the number of credits earned in the course, totaling these values, and dividing by the total number of credits earned.

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

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

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

#### Scholarship and Grades in the School of Medicine

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

Each department keeps careful records of student work. At the end of each academic year, the executive committee of the School of Medicine evaluates the accomplishment of the student during that year and determines his or her fitness for promotion. When general academic achievement is unsatisfactory in any year, the student is subject to dismissal from the school. Although a student who has been dismissed from the School of Medicine may succeed in passing a medical school course he or she has previously failed by taking it as part of his or her course in another school or college, this is not regarded as evidence that a student's abilities justify readmission to the School of Medicine. A student who has been dismissed because of low 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 PW, I, NS, NC, or N. Any grade not included in the grade-point average is identified by a diagonal line through the grade. Once a student has received a degree, the grades earned prior to the degree may not be changed. All grades earned in courses repeated prior to Winter Quarter 1971 are included in the average, unless the student again repeats the course Winter Quarter 1971 or after.

#### **School of Dentistry**

A student in the School of Dentistry who receives a grade of D on a course may not change this grade for purposes of graduation by repeating the course or taking a re-examination. A student in the School of Dentistry who receives the grade of E in a course may, with the permission of the Dean, the instructor of the course, and the executive committee of the school, be permitted to perform additional work and to take such exercises and examinations, including a final examination, as the department may prescribe. If the student completes such exercises and examinations successfully and satisfies the department and the executive committee that he or she has a reasonable knowledge of the subject in question, the grade of D may be substituted for the E originally given, and promotion can be allowed. A student in the School of Dentistry who receives a grade of E in two or more courses in a given year is denied the above opportunity to change the grades of E to D.

#### **School of Law**

A student in the School of Law in good standing who has failed a required course may repeat the course or take a second examination without registration at the time a regular examination for the course is offered. Upon re-examination, if successful, the student receives the same credit for the course that it carried at the time the student was first examined. However, instead of a new grade being assigned, a notation is made on the record that the course was passed upon re-examination.

Permission to repeat a course or to take a second examination without registration must be obtained from the Dean's office at the time of registration.

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

#### **School of Medicine**

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

# UNDERGRADUATE LOW SCHOLARSHIP

#### Warning, Probation, and Drop

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

Undergraduate students in the credit/no credit program should see "Credit/No Credit Program" for low-scholarship rules.

#### Reinstatement

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

#### **Senior in Final Quarter**

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

# UNDERGRADUATE HIGH SCHOLARSHIP

#### **Quarterly High Scholarship List**

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

#### Yearly Undergraduate Honors

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



#### **Certificates of High Scholarship**

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

#### Sophomore Medal

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

#### **Junior Medal**

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

#### **Baccalaureate Honors**

Baccalaureate honors (summa cum laude, magna cum laude, cum laude) are awarded to recipients of a first baccalaureate degree. These honors are awarded to those students who have completed no fewer than 90 credits at this institution, together with a record of distinction at institutions previously attended.

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

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

#### **President's Medal**

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

# EARNING CREDIT BY SPECIAL EXAMINATION

Regularly admitted and currently enrolled students may take special examinations, sometimes known as "challenging a course," in subject matter offered by the University to gain credit without being enrolled in specific courses. Credit may be granted—
1. For course work completed after high school graduation through extended secondary programs approved by the Washington State Board of Education.

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

3. For independent study.

4. For work completed with private teachers.

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

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

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

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

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

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

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

A student who wishes to qualify for credit by examination must apply to the Graduation Department of the Registrar's Office for a certificate of eligibility no later than Friday of the second week of the quarter. Ordinarily, the student previously has spoken with an instructor responsible for the course to determine if an examination for credit is appropriate. After the certificate has been approved and signed by the Registrar, the student presents it for signed approval to an instructor responsible for the course in which the examination is to be taken, to the Chairman of the department concerned, and/or to the Dean of the college or school concerned. Approvals and payment of \$25 per course to be challenged must be accomplished by Friday of the second week of the quarter.

Examinations are administered by the Educational Assessment Center on the fourth Saturday of the quarter.

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

#### **CLEP** Credit

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

## ADVANCED PLACEMENT

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

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

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

A student who is placed by examination at the level of MATH 125 or higher receives additional credits. If the



student's first University mathematics course is MATH 125, credit for MATH 124 is given. A student whose first mathematics course is MATH 126 is given credit for both MATH 124 and 125.

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

## REQUIREMENTS FOR A BACCALAUREATE DEGREE

To graduate, a student must meet University, college or school, and departmental requirements. Only University requirements are listed in this section. Requirements of colleges, schools, and departments appear in the section pertaining to the college, school, or department concerned.

#### Filing an Application for a Baccalaureate Degree

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

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

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

The signature of the department head or of an authorized adviser must appear on the application in the space provided for "major adviser." A student in the College of Arts and Sciences does not obtain the college Dean's signature, but leaves the application for a degree, along with the diploma card, at the Registrar's Office after the student's adviser has signed it. The application is first approved by the Registrar, then sent to the Dean of the college for signature and returned to the Registrar's Office. A student in any other college leaves the application at the college Dean's office for signature after obtaining the adviser's signature. After the application is approved, one copy is mailed to the student, the second is sent to his or her department or college office, and the third is retained in the Graduation Office. Any required course listed on the approved application cannot be changed without the submission of a written petition signed by the department head. The petition form may be obtained either at the Registrar's Office or from the advisory office.

If the application is not approved, the Registrar's Office notifies the student of the deficiency, so that the necessary adjustment may be made and the application 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**

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

#### **Degrees With Two Majors**

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

#### Two Baccalaureate Degrees Concurrently

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

#### **Second Baccalaureate Degree**

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

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

#### **Final-Year Residence Requirement**

To be recommended for a first or subsequent baccalaureate degree, a student must complete the final year of course work, at least 45 credits, as a matriculated student in residence at the University. The granting of exceptions to this rule is the responsibility of the Dean of the college or school awarding the degree.

#### **Acceptance of Transfer Credit**

The University of Washington reserves the right to accept or reject credits earned at other collegiate institutions. In general, it is the University's policy to accept credits earned at institutions fully accredited by their respective regional accrediting associations, provided that such credits have been acquired through university-level courses appropriate to the student's degree curriculum at the University of Washington.

#### **Community College Credit**

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

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

#### RULES AND REGULATIONS



#### **Graduation Requirements for ROTC Students**

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

## ADVANCED DEGREES

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

## REQUIREMENTS FOR TEACHING CERTIFICATION

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

#### **Provisional Certification**

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

#### **Applications for Provisional Certification**

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

#### **Standard Certification**

#### Petitions

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

#### **Course Approval**

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

## COMMENCEMENT

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

#### **Eligibility for Participation**

#### Baccalaureate Degrees

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

#### **Graduate Degrees**

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

#### **Dental and Medical Degrees**

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

#### **Graduation Announcements**

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

#### **Diploma Distribution**

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

## TRANSCRIPTS

Official copies of student academic records at the University of Washington that bear the official seal of the University and the signature of the Registrar are known as transcripts.

#### Charges

A charge of \$1, payable to the cashier in advance, is made for each transcript. Grade sheets cost 50 cents. Typewritten title transcripts for all records of students entering the University prior to Autumn Quarter 1929 cost \$2 for each original copy.

#### **Transcripts From Other Schools**

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

## FEES AND CHARGES

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

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

#### **Enrollment Service Fee**

A new or returning former student or continuing student in a new classification (e.g., undergraduate, fifth-year, graduate, or nonmatriculated) is required to confirm his or her intention to enroll by paying a nonrefundable \$50 enrollment service fee. The \$50 is applied toward tuition and fees assessed for the quarter for which the student is determined to be admissible and subsequently enrolls. A student who pays the fee for a given quarter but does not register in that quarter is not entitled to refund except in the situations listed below:

1. A new or returning former nonmatriculated student who cannot be scheduled for the courses requested during registration and who does not enroll or attend other courses is refunded the \$50 enrollment service fee upon written request to the Registrar. Such a request for refund must be submitted by Friday of the second week of the quarter to which it is applicable.

2. A new or returning former matriculated student who is unable to obtain courses required for completion of his or her degree or certificate program or courses that are determined by an appropriate academic adviser to be acceptable alternate courses, and who does not enroll in or attend other courses, is refunded the \$50 enrollment service fee upon written request to the Registrar. Such a request for refund must be submitted by Friday of the second week of the quarter. 3. A new or returning former student who applies by the prescribed deadline for financial aid administered by the University Financial Aids office and who cannot be awarded financial aid adequate to his or her needs as determined by that office and is therefore unable to attend the University is refunded the \$50 enrollment service fee upon application to the Registrar no later than two weeks after receipt of notice of the financial aid award.

4. A new or returning former student who is unable to attend the University because of pregnancy, disability, or death or because he or she is called involuntarily into the military service of the United States or into civil duty is refunded the amount, if any, by which the enrollment service fee exceeds the amount of tuition and fees assessed at the time of withdrawal. A request for refund must be submitted on petition forms available in the Student Accounts Office by the last day of the quarter for which the student was determined admissible and for which the enrollment service fee has been paid.

## QUARTERLY TUITION AND FEE RATES EFFECTIVE AUTUMN QUARTER 1974

Mari

Undergraduate	Resident	resident
Full fee (more than 6 credits)	\$188	\$527
6 or lewer credits:		
Minimum (first 2 credits)	53	147
Each additional credit	27	76
Graduate and Law	4	
Full fee (more than 6 credits)	208	5,47
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*. No additional fee is charged nonresident students during the Summer Quarter, except for students in the schools of Dentistry or Medicine.

#### RULES AND REGULATIONS



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

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

Auditors: There is no reduction in fees for auditors.

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

*Miscellaneous Charges:* A registration service charge of \$15 is assessed a student granted permission to register after the last scheduled day of registration. A student who must register as a result of a cancellation must also pay a \$15 fee. Waiver or refund of this service charge is made only at the discretion of the Registration Appeal Board.

A charge of \$5 is made for each change of registration or change of section, or number of changes that are simultaneous after the official change of program period.

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

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

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

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

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

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

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

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

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

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

#### **Placement Fees**

File establishment fee	\$5	
Registration fee (for alumni only; no registration fee for students)	\$5 annually	
Employment opportunity notificati mail service fee (for alumni)	ion \$10 annually	
Confidential credential fee (sold in sets of five only)	\$5 per set	
Students	First set of five credentials free	
Alumni	\$10 per set of five credentials	
Parking Fees		
Student's Quarterly Permits	•	
Residence hall lots	\$24.00	
Evening classes	9.00	
Motorcycles and scooters	5.00	
Daily Rate		
Urban Renewal lots	.25	
Montlake lots: E1 and E12	.25	
Montlake lots: E5 and E4	.10	
Alumni Parking Fees Student's Quarterly Permits Residence hall lots Evening classes Motorcycles and scooters Daily Rate Urban Renewal lots Montlake lots: E1 and E12 Montlake lots: E5 and E4	five credentials free \$10 per set of five credentials \$24.00 9.00 5.00 22 .25 .10	

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

#### **Deposits and Rentals**

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

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

#### **Refund of ROTC Deposit**

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

#### **Cancellation of Tuition and Fees**

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

#### **Continuing Students**

 $1._1$ 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.

#### **Enrollment Service Fee**

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

## RESIDENCE REQUIREMENTS

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

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

2. In determining a student's intent with regard to his Washington domicile, consideration is given to whether he or she is a registered voter of the state of Washington. If the student is a minor (under age 18), consideration is given to the voting registration of the parents or legal guardian. Voting in person or by absentee ballot in the state of previous domicile is considered inconsistent with, and contradictory of, intention to establish legal domicile in this state.

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

#### RULES AND REGULATIONS



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

5. The establishment of a domicile in the state of Washington by a parent or legal guardian entitles a minor (under age 18) to classification as a resident student. When the parents of a minor are deceased, the minor's domicile follows that of the legally appointed guardian. When the parents are divorced, the minor is entitled to classification as a resident student if one of the parents has established a domicile in the state of Washington.

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

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

8. Any person not a citizen of the United States cannot establish a Washington domicile until he or she is eligible and has applied for an immigration visa, and has been physically present in the state of Washington for one full year prior to the quarter for which he or she is requesting a change of residence status. 9. Regardless of age or domicile, the following persons are entitled to classification as resident students: persons employed not less than twenty hours per week by a state of Washington higher institution of learning, and the children and spouses of such persons; military personnel and federal employees residing or stationed in the state of Washington, and the children and spouses of such military personnel and federal employees; all veterans whose final permanent duty station was in the state of Washington, so long as such veterans are receiving federal, vocational, or educational benefits conferred by virtue of their military service.

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

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

## EXEMPTION FROM NONRESIDENT PART OF TUITION AND FEES

The following categories of students may be exempted from the nonresident portion of tuition and fees. Students in these categories should contact the offices shown either for information on the exemption or to obtain the appropriate form to apply for the exemption. *Most of the exemptions must be renewed each quarter* and should be renewed before the beginning of the quarter. Students classified as nonresidents are invited to contact the Office of Residence Classification, 320 Schmitz, to learn the requirements for permanent resident classification and to apply for classification as residents as soon as they might meet the requirements. Any application for permanent change in residence classification must be filed prior to the first day of the quarter for which the student is requesting the change. Applications received after the first day of the quarter become effective, if granted, the following quarter.

#### Form to Use

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

"Scholarship, Grant, or Exemption Authorization."

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

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

"Application for Refund of the Nonresident Portion of Tuition and Fees by Virtue of University of Washington Employment," revised 7/71.

"Scholarship, Grant, or Exemption Authorization."

"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 academic personnel.

Academic personnel.

Category

Staff personnel eligible for tuition-free course of 6 credits or less.

Staff personnel (1) not eligible for tuition-free course or (2) taking more than 6 credits.

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.

Spouses and children of staff personnel working at least twenty hours per week.

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 to Contact

Scholarship and Loan Fiscal Office, 170 Schmitz; questions regarding eligibility may be directed to the Academic Personnel Records Office, 316 Administration.

Academic Personnel Records Office, 316 Administration.

Scholarship and Loan Fiscal Office, 170 Schmitz; an information sheet explaining eligibility may be obtained from the Staff Personnel Office, 3903 Brooklyn Avenue Northeast.

Office of Residence Classification, 320 Schmitz; information sheet explaining eligibility may be obtained from the Staff Personnel Office, 3903 Brooklyn Avenue Northeast.

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.

Staff Personnel Office, 3903 Brooklyn Avenue Northeast.

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.

## RULES AND REGULATIONS



#### Category

Graduate students with graduate service appointments.

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

Military employees and their spouses and children.

Federal employees and their spouses and children.

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

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

Spouses of graduate students with graduate service appointments. Office to Contact

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

Office of Residence Classification, 320 Schmitz.

#### Form to Use

"Scholarship, Grant, or Exemption Authorization."

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

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

Scholarship and Loan Fiscal Office, 170 Schmitz. Upon presentation of discharge papers, "Veterans Tuition Exemption Card," UW 502.

"Dependent Tuition Exemption Request," UW 101SLF.

#### Veterans and Children of Deceased or Totally Disabled Veterans

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

Veterans with disabilities may have available benefits. They should contact a training officer in the nearest Veterans Administration office.

## FINANCIAL OBLIGATIONS

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

Until this hold is cleared, the University (1) does not release the student's record or any information based upon the record, (2) does not prepare transcripts, and (3) denies registration for a subsequent quarter as well as graduation from the University.

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

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

## STUDENT IDENTIFICATION

Each student may obtain, without cost, a photoidentification card at the time of first registration at the University. This card is the student's means of establishing entitlement to the rights and privileges that normally accrue to students.

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

Lost or destroyed photo-identification cards may be replaced by the student's making a request for replacement at the University Cashier's Office and paying a \$5 fee. Replacement of cards made invalid by changes in students' names or of cards rendered unusable by normal wear and tear is done without charge upon return of the original card.

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

## UNIVERSITY POLICY ON STUDENT RECORDS

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

#### **General Rule**

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

#### **Requests From Outside the University**

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

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

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

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

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

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

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

#### RULES AND REGULATIONS



#### **Requests From Inside the University**

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

a. Academic record and status.

b. Reports of academic and other campus misconduct, including disciplinary action.

c. Results of counseling other than professional, medical, or psychological.

d. National origin and ethnic background.

e. Standard test data regarding specific tests when needed for decisions about an individual.

f. Student-produced course paper.

g. Financial information, including delinquencies, etc.

h. Student evaluative materials, with the consent of the author of the evaluation.

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

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

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

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

## UNIVERSITY RECORDS

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

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

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

#### **Records Committee**

The Registrar is the official custodian of academic records and, therefore, is the only official who may issue a transcript. The Registrar, together with a committee of six, including representation from faculty, graduate and undergraduate students, and the Attorney General's Division, is responsible for reviewing unusual requests for information and for assisting in the interpretation of these rules.

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# UNDERGRADUATE EDUCATION

Eligibility for admission is determined by the Board of Admissions, Scholastic Standards, and Graduation, according to criteria established by the University faculty. An admitted student is required to enter one of the University's colleges or schools, even though not yet prepared to choose an academic major. If the student chooses a major from among the more than one hundred curricula available, he or she is enrolled in the school or college offering the program and, if space is available, in the major department of his or her choice. A student who prefers to sample the rich variety of courses offered before commitment to a major, or who wishes to undertake a preprofessional curriculum (e.g., prelaw, premedicine, or predentistry) also is enrolled as a premajor in the College of Arts and Sciences. Admittance into the College of Arts and Sciences as a premajor, however, is contingent upon the availability of space for the quarter for which the student has applied. There is no commitment on the part of the University to accommodate a student into a specific academic program after accepting him or her as a premajor. into the College of Arts and Sciences.

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

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

## ADMISSION POLICY

To be considered for admission to the University's undergraduate colleges, a student must satisfy the minimum admission criteria described below. Because there are more applicants than can be accommodated, however, satisfying these minimum standards does not guarantee admission to the University. Special consideration is given to academic qualifications, date of application, applicant's choice of curriculum, and availability of space at the proposed level of entrance. Students admitted to the University and as premajors into the Col-



lege of Arts and Sciences cannot be assured acceptance into the departmental or professional programs. Selection for entry into such curricula is academically competitive and is contingent on the availability of space and resources in a specific program for the quarter the student has applied.

#### **Educational Opportunity Program**

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

#### Nonresident Students

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

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

#### **Resident Status for Tuition Purposes**

A resident student is one who has been domiciled in the state of Washington for the period of one year immediately prior to the time of commencement of the first day of the quarter for which he or she has registered and who has established a domicile for other than educational purposes. A nonresident student enrolled for more than six hours per quarter is considered as attending for educational purposes only unless that student proves that he or she has, in fact, established a domicile in the state for other than educational purposes. If a student is a minor (under age 18), the domicile is normally determined by that of the parents or legal guardian. For factors important in determining the legal domicile of the student, see the "Rules and Regulations" section of this catalog,

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

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

#### **Foreign Students**

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

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

#### **Board of Admissions**

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

#### **Application Deadlines**

Application deadlines\* are as follows:

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

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

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

\* These dates are subject to change by the University.

#### Admission Criteria for Freshman Applicants

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

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

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

#### **Admission Criteria for Transfer Applicants**

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

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

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

COLLEGE OF ARCHITECTURE AND URBAN PLANNING	3
Architecture (Environmental Design), Landscape Architecture,	
Urban Planning (Environmental Design)	<u>90</u> ≠
Building Construction	45
COLLEGE OF ARTS AND SCIENCES	75
SCHOOL OF BUSINESS ADMINISTRATION	90*
SCHOOL OF DENTISTRY	
Dental Hygiene	90*
COLLEGE OF EDUCATION	90*
COLLEGE OF ENGINEERING	45
COLLEGE OF FISHERIES	
Fisheries Science, Food Science	75
COLLEGE OF FOREST RESOURCES	75
SCHOOL OF MEDICINE	
Physical Therapy, Occupational Theraby,	
Medical Technology, Prosthetics and Orthotics	<del>9</del> 0*
SCHOOL OF NURSING	
Basic Program.	45
SCHOOL OF PHARMACY	45
SCHOOL OF SOCIAL WORK	
Social Welfare	90*

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

#### **Admission of Fifth-Year Students**

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

New students and former students who have not attended the University since they received their baccalaureate degrees must make application through the Office of Undergraduate Admissions and must be accepted by one of the undergraduate colleges. In selecting students for this classification, careful consideration is given to their scholastic record during the junior and senior years of undergraduate study as an indication of probable success in achieving their educational objectives. Ordinarily, a resident of Washington is ex-



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

#### Nonmatriculated Standing

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

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

#### **Admission of Auditors**

An individual who wishes only to audit courses should apply through the Office of Undergraduate Admissions for nonmatriculated standing. Attendance in courses as an auditor is by consent of the instructor involved and is conditioned by the extent to which space is available. Permission to audit is ordinarily granted for lecture classes only. An auditor may not participate in class discussion or laboratory work, and his or her registration may be canceled at the discretion of the instructor.

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

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

All applicants must fulfill admission criteria described elsewhere in this catalog.

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

### ADMISSION PROCEDURE

#### Application

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

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

#### Notification of Admission Status

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

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

#### **Retention of Records**

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

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

#### **Campus Visitation**

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

#### **Housing Reservations**

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

## **EXAMINATIONS**

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

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

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

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

#### **Mathematics Placement Tests**

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

A transfer student who wishes to take mathematics courses at the University, but who has not yet taken



any mathematics course in college, is assigned the appropriate course on the basis of placement tests. A transfer student who already has completed a college mathematics course, however, continues on to the next higher course without taking a placement test.

#### **Freshman English Qualifying Test**

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

#### **Foreign Language Placement Examination**

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

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

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

#### **Credit Examinations**

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

## HONORS

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

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

#### **Special Honors Sections**

Some colleges provide special courses and special sections of other courses for the unusually talented. Though primarily intended for those enrolled in formal honors programs, some sections are open to other qualified students.

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

## CHOOSING A MAJOR

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

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

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

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

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

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

#### Change of College or Major

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

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

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

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

## ACADEMIC REQUIREMENTS

#### Credit Load

A full-time undergraduate student is one who is carrying at least 12 academic credits. A graduate stu-

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

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

#### **Minimum Grade Points**

The student is expected to maintain a reasonable level of academic performance consistent with University standards.



# GRADUATE STUDY THE GRADUATE SCHOOL AND RESEARCH

#### **Officers of the Graduate School**

Joseph L. McCarthy, Ph.D. Dean

Patricia Keller, Ph.D. Associate Dean

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

Morgan D. Thomas, Ph.D. Associate Dean

Herman McKinney, M.S.W. Assistant Dean

Henrietta Wilson, M.A. Special Assistant

James D. Linse, B.A. Administrator

## Executive Committee of the Graduate School

Joseph L. McCarthy, Chairman

J. E. Augerot, Group I

R. Lorenzen, Group II I. Namioka, Group III A. Ferrill, Group IV W. T. Burke, Group V M. Robkin, Group VI D. R. Morris, Group VII

R. C. Canfield, Group VIII

#### Graduate Faculty Council and Group Operating Committees

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

#### Group I

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

Group II

D. Bennett, W. Bergsma, R. Lorenzen (Chairman), S. Moseley, G. B. Varey

#### Group III

N. H. Anderson, D. Bevan, A. Gorbman, I. Namioka (Chairman), J. Sabo

#### **Group IV**

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

#### : Group V

C. Burgess, W. T. Burke (Chairman), J. E. Kittell, J. F. Truitt, J. Wickman

#### **Group VI**

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

#### **Group VII**

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

#### Group VIII

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

## GRADUATE STUDY

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

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

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

In addition to its primary role in relation to graduate students, graduate faculty, and graduate study programs and degrees, the Graduate School is responsible for the administration of certain academic or research activities

and facilities of general significance in all or many fields of knowledge throughout the University. The Graduate School is administered through the Office of the Dean, the Executive Committee of the Graduate School, Group Operating Committees, and the Graduate Faculty Council. The Graduate Faculty Council is composed of representatives elected to eight Group Operating Committees by the members of the graduate faculty, and it and the Executive Committee of the Graduate School serve as the legislative and policy-making bodies of the Graduate Faculty. The Executive Committee consists of the Dean of the Graduate School and the elected chairman of each of the eight Group Operating Committees; it acts as an advisory group to the Dean and as an administrative committee for the Graduate Faculty Council.

The University of Washington Graduate School recog-, nizes 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 chacterized by the independent study and research that the graduate student is expected to conduct. The results of this independent study and research are set forth in a master's thesis or a doctoral dissertation. A master's thesis is a modest contribution to knowledge, or a 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 seventy-eight departments or other organizational units of the University and the names of these programs, the graduate degrees offered, and the names of the Graduate Program Advisers are given in this catalog.

On other pages of this catalog, information is given in some detail concerning policies and procedures relating to admission into, and completion of, specific graduate degree programs. These statements are simply illustrative of arrangements relating to admission into, and completion of, graduate degree programs; they are not to be taken as specific requirements of the respective programs. For individual students the specifications for completion of the graduate degree programs may be provided initially by the Graduate Program Adviser and then by the graduate student's Supervisory Committee.

#### **Graduate Program Adviser**

The graduate student's initial work at the University is guided by the Graduate Program Adviser in his or her field. This adviser is a senior member of the faculty who provides, or arranges for the providing of, responsible advice, guidance, and assistance to students working for advanced degrees in the program or programs offered by the faculty in the department, school, or the University unit. The Graduate Program Adviser maintains close familiarity with policies and procedures in the Graduate School and provides overall coordination for the activities within the department. In the absence of the Graduate Program Adviser, these responsibilities are carried by an alternate program adviser.

#### **Courses for Graduate Students**

Courses numbered 500 and above are intended for, and restricted to, graduate students. Some courses numbered in the 300s and 400s are open both to graduates and to upper-division undergraduates. Such courses, when acceptable to the Supervisory Committee and the Dean of the Graduate School, may be part of the graduate program. The Graduate School accepts credit in approved 300-level courses for the minor or supporting fields only; approved 400-level courses are accepted as part of the major.

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

#### **Grading Practices in Graduate Courses**

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

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

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

#### Graduate Degree Programs Offered and Names of Graduate Program Advisers

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

**Graduate Degrees** M.S.A.&A., M.A.&A., Ph.D. M.A., Ph.D. M.Arch. M.A., M.F.A., M.A.T. Ph.D. M.A., Ph.D. M.S., Ph.D. M.S., Ph.D. M.S., Ph.D. M.S., Ph.D. M.A.T. M.S., Ph.D. M.A. M.S., Ph.D. M.A., M.B.A., Ph.D. M.S.Cer.E., Ph.D. M.S.Ch.E., Ph.D. M.S., M.A.T., Ph.D., D.A. M.S., M.S.C.E., M.S.E., Ph.D. M.A., Ph.D. M.S., M.C., Ph.D. M.A., Ph.D. M.S., Ph.D. M.S.Den. M.A. Ph.D. M.A. M.A. M.A., Ph.D. M.Ed., Ed.D., Ph.D. M.S.E.E., Ph.D. M.A., M.A.T., Ph.D. Ph.D. M.S., Ph.D. M.S., M.F.R., Ph.D. M.S., Ph.D. M.A., Ph.D. M.S., Ph.D. M.S., Ph.D. M.A., Ph.D., D.A. M.HealthAdmin. M.A., Ph.D. M.A., M.S. M.Ş.É. LL.M., Ph.D. M.Libr., M.LawLibr. M.A., Ph.D. M.A., M.S., M.S.Math.Stat., M.A.T., Ph.D. M.S.M.E., M.S.E., Ph.D. M.S.Met.E., Ph.D. M.S., Ph.D. M.S. M.A., M.A.T., M.M., D.M.A., Ph.D. M.A., M.A.I., M M.A. M.S.N.E., Ph.D. M.A., M.N. -M.S., Ph.D. M.S., Ph.D. M.S., Ph.D. M.S., Ph.D. M.S., Ph.D. M.S. M.S., Ph.D. M.S., M.S.Phys.Ed. M.S., Ph.D., D.A. M.S., Ph.D. Ph.D. M.A., Ph.D. M.S., Ph.D. M.P.A. M.S.P.H., M.P.H. M.S.Rad.Sci. M.S., M.O.T., M.P.T. M.A., Ph.D. M.A. M.A., Ph.D. M.A., Ph.D. M.S.W. M.A., Ph.D. Ph.D. M.A., M.Sp.Path.&Aud., Ph.D. M.U.P., Ph.D. M.S., Ph.D.

**Graduate Program** Adviser J. Kevorkian . M. Eastman C W. Wherrette W. Brazeau M. Rogers J. L. Norman K.H.Bohm R.G. Fleagle K.A. Walsh C. Rosse I.D. Olsen R. Kronmal C. Bodemer R. B. Walker R.A.Johnson W.D.Scott R. W. Moulton D. F. Eggers H. P. Mittet W.C.Grummel W. E. Ames F. W. Jones D. Dekker S. Schluger J. R. Crider R. Loper K. Yamamura G. M. Brown R.G.Olstad R.N.Clark J.D.McCracken E.R. Alexander L.S.Smith R.I.Gara W. L. Fangman J. Velikonja J. M. Rensberger C. F. Raymond S. McLean T. R. Seifert D. H. Pinkey M.L.Johnson K.L.Garlid J.C. Huston M. M. Benne S. Saporta R. Warfield A. E. Kobayashi T. F. Archbold H. C. Douglas R.J.Campbell J. M. Beale N. L. Heer A. L. Babb D. Crowley J. C. Lewin I.A.Siegel E.A. Smuckler J. E. Orr D.C.Dyer J.E.Orr C. Marks T.L.Doolittle D. Boulware J.G.Skahen M.H.Smith D. Hellmann I. Sarason M. E. Wolters J.L.Gale K. Jackson J.F. Lehmann A. Pace P. F. Sugar **B.** Steene W.A.Konick C.J. MacDonald H.L.Costner M. Thomas B. Baskerville R. L. Ludwig

Alternate Graduate **Program Adviser** R. J. Bollard E. V. Winans C. Kelley C. L. Hafermehl M. Kingsbury R. A. Miller G. Wallerstein P.V. Hobbs J. M'. Keller P. Coates R. Olstad B. Jayne P.R. Sloan V.E.Buck R.J.Campbell J.C.Berg N.W.Gregory E.P.Richey C.N.Edmonson D.R. Pember E. Behler H. Golde A.W. Moore J.D. Sydow J.R. Wolcott D. Hellmann J. Thornton F. T. Giles D.G.Dow A.R. Hilen J.P.Fox A.C.DeLacy S. P. Gessel H. L. Roman J.C. Sherman R. L. Gresens R. T. Merrill J.B. Voyles A. Blackman E.R. Monsen R.N.Clark W.T.Burke E. Pope T. Hungerford D. E. McFeron P. H. Polonis J. Falkow J. I. Mueller F. Ziadeh K. L. Garlid E. Brandt R. Carpenter M. Rabinovitch D. Lagunoff L. R. Brady A. Horita D. L. Sorby D. Keyt **B.** Mathews L. S. Brown H. D. Patton E.S. Luschei P. Brass R. Kohlenberg B.C.Denny

L. Mickelson C. Y. Takagi D. Schmitt P. A. Yantis R. D. Shinn D. S. Farner

B. S. Gilson G. Christensen W. C. Stolov

M. Predmore J. E. Augerot H. K. Schmsdorf

A.W. Martin

#### GRADUATE STUDY



instructor may employ any of the above grades consistent with the policies of the faculty in his academic unit, except as provided for in 3. and 5. below.

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

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

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

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

6. The grade of N is appropriate for students enrolled from quarter to quarter for 600, Independent Study or Research; 700, Master's Thesis; and 800, Doctoral Dissertation. An N grade indicates that satisfactory progress is being made, but evaluation depends on completion of the research, thesis, or dissertation, at which time the instructor or Supervisory Committee Chairman should change the N grade or grades to one that is more appropriate to the final evaluation (normally CR/NC).

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

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

#### Scholarship

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

## Language Competence Requirements and Examinations

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

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

Faculty in a particular graduate academic unit have, for graduate programs in that unit, identified certain foreign languages other than English in which competence may be desirable or helpful (e.g., languages in which a substantial literature exists or which may have special significance in relation to the field) and have specified whether or not a reading competence in one or more of these languages is to be required. Thus, the foreignlanguage competence requirement for graduate students at the University of Washington is that established by the Graduate Faculty in the unit offering the graduate program and reported to the Dean of the Graduate School.

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

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

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

#### Residence

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

A full quarter of residence is granted for any quarter in which at least 9 credits in graduate course, research, thesis, or dissertation work are acceptably completed.

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

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

#### **Final Quarter Registration**

A student must be registered as a full-time or part-time student at the University during the quarter the master's or doctoral degree requirements are completed.

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

#### **Continuous Enrollment**

#### Policy

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

#### Registration

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

#### **On-Leave Student Status**

If a graduate student in good standing plans to be away from the University and out of contact with the University faculty and facilities for a period of time, usually not to exceed four successive quarters, he or she must obtain on-leave student status after the student's petition for on-leave status has been approved by the Graduate Program Adviser. The student must have registered for and completed at least one quarter of work in the University of Washington Graduate School to be eligible for on-leave status. This status maintains a place for the student as a member of the Graduate School and permits him or her to use the University Library and to sit for foreign-language competence examinations, but



does not entitle the student to any of the other University privileges of a regularly enrolled and registered full- or part-time student. The student pays a nonrefundable fee of \$5 to obtain on-leave student status, and this fee covers four successive academic quarters or any single part thereof. An on-leave student returning to the University on or before the termination of the period of his or her leave must file a former student enrollment application before the application deadline and must inperson register in the usual way as a full- or part-time student; this registration cancels any remaining leave period. If circumstances require a later leave of absence, the student must petition and must proceed again in the same manner as for an initial leave of absence.

#### Readmission

A student previously registered in the Graduate School who has failed to maintain continuous enrollment but who wishes later to resume his or her studies must file an application for readmission to the Graduate School by the regularly published closing dates in person or by mail. If the student is readmitted, registration will occur during the usual registration period. If the student has attended any other institution during the period when he or she was not registered at the University of Washington, official transcripts in duplicate of the student's work must be submitted. An application for readmission carries no preference and is treated in the same manner as an application for initial admission, including the requirement of payment of the application fee of \$10.

#### **Military On-Leave Status**

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

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

#### **Graduate Student Classifications**

The following system classifies graduate and postdoctorate students into four categories based upon the extent of their advancement toward, or completion of, graduate degrees:

Category Number Title 1 Premaster

2 Intermediate

Candidate

School, but has not yet completed a master's degree or the equivalent (i.e., 36 quarter credits or more of course or research work applicable to an advanced degree).

**Description** 

Admitted to the Graduate

- Completed a master's degree or the equivalent, but has not yet been admitted as a Candidate for a doctoral degree (i.e., has not yet completed the General Examinations).
- Admitted as a Candidate, but has not yet completed a doctoral degree.

## 4 Postdoctorate

3

Has completed a doctoral degree.

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

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

#### Master's Degree

#### Summary of Requirements

Each aspirant for the master's degree must meet the following requirements:

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

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

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

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

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

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

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

8. Any additional requirements imposed by the Graduate Program Adviser in the student's major department or by the student's Supervisory Committee must be satisfied.

A master's student usually takes some work outside the major department. The Graduate Program Adviser in the major department or the student's Supervisory Committee determines the requirements for the minor or supporting courses.

9. The graduate student must make application for the master's degree at the Graduate School office within the

first two weeks of the quarter in which he or she expects the degree to be conferred, in accordance with "Application for the Master's Degree," as described below.

10. The graduate student must be registered either as a full- or part-time student at the University for the quarter in which the requirements for the degrees are completed (see detailed information under "Final Quarter Registration").

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

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

#### **Preparation and Advising**

A graduate student is expected to be appropriately prepared for the graduate program into which he or she is admitted and should confer with the Graduate Program Adviser in his or her field, or with the Graduate Program Adviser's representative, in planning a study program and frequently thereafter during the course of graduate study.

#### Transfer and Extension Credit

A student pursuing a graduate program leading to the master's degree may transmit a written petition to the Dean of the Graduate School requesting permission to transfer up to 9 graduate quarter credits taken while a graduate student in another recognized Graduate School to be applied toward the master's degree here. The petition must be accompanied by a written recommendation from the Graduate Program Adviser.

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

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

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

#### Examination

As soon as is appropriate, but not later than the time that the student's application for the degree has been approved, the faculty in the student's major department appoints a Supervisory Committee, ordinarily consisting of two or three members but not more than four. The committee chairman arranges the time and place of the final examination, the results of which must be reported by the Graduate Program Adviser to the Graduate School office at least two weeks before the date on which the degree is to be conferred. The examination may be oral or written, and all members of the Supervisory Committee must certify its results. If the examination is not satisfactory, the committee may recommend to the Dean of the Graduate School that the student be allowed to take another examination after a period of further study.

#### Thesis

The master's thesis should be evidence of the graduate student's ability to carry out independent investigation and to present the results in clear and systematic form. Two copies of the thesis, normally written in the English language, along with forms signed by the members of the Supervisory Committee from the major department, must be deposited in the Graduate School office at least two weeks before the end of the quarter in which the degree is to be conferred. The faculty in the department may require the student to present an additional copy for its own use. Instructions for the preparation of theses in acceptable form may be obtained at the Graduate School office.

#### **Nonthesis Programs**

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

#### Application for the Master's Degree

The student must make application for the master's degree at the Graduate School office within the first two weeks of the quarter in which he or she expects the degree to be conferred. The filing of the application is the responsibility solely of the student. When the application is received, the student's record is reviewed in the Graduate School office. The previous work taken by the student, together with the current registration as planned with the approval of the Graduate Program Adviser in the student's department, must meet the requirements for the degree if the application is to be approved. The applicant is notified promptly as to

whether or not the general requirements for the degree will be satisfied at the end of the quarter and, if approved, the application is forwarded to the departmental Graduate Program Adviser.

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

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

The student and the departmental Graduate Program Adviser should be thoroughly acquainted with the requirements for the particular degree.

#### **Master's Degrees for Teachers**

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

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

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

#### **Candidate's Certificate**

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

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

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

#### **Doctoral Degree**

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

#### Summary of Requirements

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

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

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

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

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

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

6. Preparation of a dissertation that is a significant contribution to knowledge and clearly indicates training in research. Credit for the dissertation ordinarily should be at least one-third of the total credit. The Candidate is expected to register for a minimum of 27 credits of dissertation over a period of at least three quarters. Normally, two of these three quarters must come after the student passes the General Examination and before a warrant is authorized for the Final Examination.

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



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

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

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

#### **Preparation and Advising**

Graduate students are expected to be appropriately prepared for the graduate programs into which they are admitted.

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

#### Special Individual Ph.D. Programs

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

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

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

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

#### Doctor of Arts Degree

The Council of Graduate Schools in the United States has declared as a matter of policy that "preparation at the doctoral level for a career in the practice of undergraduate college teaching, ordinarily in one of the fields of the humanities or the social sciences or the natural sciences, may be recognized by the award of the degree of Doctor of Arts." The Graduate School of the University of Washington recognizes that further study leading to the Doctor of Arts degree may be appropriate for those who look forward to a career of professional practice in undergraduate or community college teaching and who desire to carry their preparation beyond the master's degree. Thus, policy has been approved to record that the Doctor of Arts degree may be offered at the University by the faculty in specifically authorized graduate units, and general characteristics expected in graduate programs that may be offered leading to this degree have been established.

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

#### Appointment of Doctoral Supervisory Committee

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

#### Admission to Candidacy for the Doctoral Degree

At the end of two years of graduate study, and after successful demonstration of foreign-language proficiency, if required, the Chairman of the Supervisory Committee may present to the Dean of the Graduate School, for approval, a warrant permitting the student to take the General Examinations for admission to candidacy for the doctoral degree. This means that, in the opinion of the committee, the student's background of study and preparation is sufficient to justify the undertaking of the examinations. The warrant should indicate time, place, and manner of examination, and must be received at least two weeks prior to the proposed examination date. The warrant is approved by the Dean of the Graduate School only after the prescribed requirements of residence and study have been met. If the examination is oral, a majority of the examining committee must be present during the entire examination.

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

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

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

#### **Dissertation and Final Examination**

The Candidate must present a dissertation demonstrating original and independent investigation and achievement. The dissertation, normally written in the English language, should reflect not only mastery of research techniques but also ability to select an important problem for investigation and to deal with it competently. Requirements for the preparation of the dissertation in acceptable form may be obtained from the Graduate School office.

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

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

If the Final Examination is satisfactory, the Supervisory Committee signs the Graduate School's warrant and returns it at least two weeks before the end of the quarter in which the degree is to be conferred. If the examination is unsatisfactory, the Supervisory Committee may recommend that the Dean of the Graduate School permit a second examination after a period of additional study.

#### **Publication of Doctoral Dissertations**

All doctoral dissertations are published in full on microfilm. Two weeks before the end of the quarter in which the degree is to be conferred, the Candidate must present two copies of his or her dissertation at the Graduate School office. Each copy is to be accompanied by a copy of the Reading Committee report and an abstract, not exceeding six hundred words in length, which has been approved by the Supervisory Committee at the time of the Final Examination. A receipt for the \$25 publication charge must be shown when the dissertation is presented.

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

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

#### Admission to the Graduate School Regular Graduate Student Status

In general, properly qualified students who are graduates of the University of Washington or of other col-



leges or universities of recognized rank are eligible to apply to the Graduate School. However, all current and prospective students should realize that the University is now operating under a policy of restricted enrollment, and registration is contingent on available space and facilities.

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

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

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

Admission to the Graduate School usually signifies admission into a particular program of graduate study leading to a master's degree or the equivalent, or into post-master's study if the student admitted already has received a master's degree or has successfully completed equivalent graduate study. Acceptance of a graduate student into a program of study leading to a doctoral degree is *not* implied by admission to the Graduate School but is usually signified by the appointment of a doctoral Supervisory Committee for a graduate student who has been previously admitted to the Graduate School and has demonstrated the apparent ability, as decided by the University, to progress satisfactorily in a doctoral degree program.

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

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

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

#### **Visiting Graduate Student Status**

A student who wishes to enroll for a single summer session or a single quarter in the Graduate School at the University of Washington and who intends thereafter to return to the graduate school in which he or she is carrying forward his program of studies for an advanced degree may be admitted as a Visiting Graduate Student. This admission is contingent on available space and facilities.

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

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

For any student admitted on these bases, it is understood that his or her registration will terminate at the end of the single quarter or the single summer session for which he or she is enrolled. If at any later time the student wishes to apply for admission to the Graduate School of this University to work toward a degree, he or she must make formal application and submit complete credentials. If a Visiting Graduate Student is later given formal admission and enters upon work toward a degree at the University of Washington, he or she may petition the Dean of the Graduate School for allowance of credit for courses taken as a Visiting Graduate Student to apply to the work for such a degree.

#### Admission Procedures

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

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

#### **Regular Graduate Student**

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

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

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

All records become a part of the official file and can be neither returned nor duplicated for any purpose. A student should obtain an additional copy of his or her official credentials to keep for advisory purposes. Failure to submit complete credentials is considered a serious breach of honor and may result in permanent dismissal from the University. General information and instructions for registration are mailed to new students with the notice of admission. In the event of a discrepancy, these instructions supersede those found in earlier publications. The University assumes no responsibility for students who do not apply the information or observe the instructions or for applicants who come to the campus before they have been officially notified of their admission.

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

University of Washington students who are within 6 credits of completing their undergraduate work and who otherwise meet the requirements for admission to the Graduate School may register the quarter just prior to admission to the Graduate School for as many as 6 credits in graduate courses in addition to their 6 credits of undergraduate work. This registration and these arrangements must receive prior approval by the Graduate School: however, students concerned are not reclassified as graduates until the baccalaureate degree has been granted and after their official admission to the Graduate School. Only under these circumstances may graduate work taken as an undergraduate be applied toward an advanced degree. Further registration for graduate work is contingent upon completion of the requirements for the baccalaureate degree.

#### **Foreign Students**

Students educated abroad are expected to meet the same general requirements as all other applicants educated in American schools. The admission application, official credentials, and the \$10 admission application fee must be received in the Graduate Admissions Office at the University of Washington before the closing dates for domestic graduate students. In addition, applicants must demonstrate a satisfactory command of English and must have sufficient funds available in the United

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States to meet their expenses. The \$10 fee, which must accompany the admission application, must be payable in United States currency in the form of an international postal money order, a draft on a United States bank, or a traveler's check.

#### Veterans

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

#### Visiting Graduate Students

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

#### University of Washington Seniors

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

#### Second Bachelor's Degree or Standard Teaching Certificate

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

#### **Registration in the Graduate School**

A regular graduate student is a student who fulfills the following requirements: (1) He or she has been granted regular admission to the Graduate School; (2) his or her current program of studies is satisfactory to the Graduate Program Adviser; (3) he or she has received medical clearance from the Student Health Service; and (4) he or she has completed all of the required steps for registration, including the depositing of registration materials at Sections and the payment of tuition and fees.



Visiting Graduate Students follow regular registration procedures.

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

#### **Registration Procedure**

All students currently attending the University who wish to attend a succeeding quarter must participate in advance registration and pay fees by the stated deadline. This would include students registered for Spring Quarter who wish to attend Summer Quarter or Autumn Quarter or both. Students are held responsible for knowing and observing the registration procedures, dates, and deadlines that appear in this catalog, in *Official Notices*, in the University of Washington *Daily*, and on campus bulletin boards.

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

#### Advising

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

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

## Financial Aids: Assistantships, Associateships, Fellowships, Loans, and Employment

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

#### Fellowships, Traineeships, and Scholarships

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

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

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

#### Graduate Student Service Appointments

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

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

Appointments are granted only to graduate students of high intellectual competence and attainment whose educational goals are clearly defined. An appointment is made only when it is reasonably certain that it will help the student toward the attainment of his goal. 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 below sets forth a three-level appointment structure providing for specific correlation between the student's eligibility for the higher appointment categories and his or her progress toward an advanced degree. This structure also provides for a range of stipends for students at various levels of merit and achievement. A graduate student's classification, depending on his or her stage of progress at the University, is defined in the footnotes following the table.

#### **Employment Opportunities**

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

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

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

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



Two special categories for teaching appointments and one for research appointments are provided above the predoctoral associate level: predoctoral instructor, for the graduate student who has achieved Candidate status and is ready for increased teaching responsibility; predoctoral lecturer, for a mature and competent graduate student who, though he need not be a Candidate, has had exceptional previous teaching or other professional experience; and predoctoral researcher, for the student who has special skills or qualities obtained outside of his or her experience as a graduate student or who carries major responsibilities in relation to research activities. For the 1974/75 academic year these appointments carry a minimum stipend of \$503 per month (half time) with no designated maximum so that the stipend may be adjusted to a level appropriate to the appointee's experience and his or her teaching and research responsibilities.

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

Students who hold any of the above appointments are required to render twenty hours of service per week to the University. The appointments may be on a ninemonth 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, a minimum of 9 credits in formal courses or in research, thesis, or dissertation work. These credits must be in courses that are applicable toward an advanced degree.

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

#### Loans

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

The National Direct Student Loan Program provides a maximum annual loan to graduate students of \$2,500 and bears an interest rate of three percent. There are certain cancellation provisions in the NDSL for combat-zone veterans and teachers of the disadvantaged. Loan application forms for this program are available in the Office of Student Financial Aid, 105 Schmitz, and the application date will be approximately February 1, 1975, for the 1975/76 academic year.

The Federally Insured Student Loan Program provides for a long-term commercial bank loan in which the graduate student can borrow up to a maximum of \$2,500 per year, depending on individual lending institutions' policies. This loan bears a seven percent interest rate, which may be subsidized by the government during the duration of full-time, continuous enrollment to a stated degree completion date. Applications may be obtained at the student's bank or through the Office of Student Financial Aid. Lending institutions establish their own application deadlines and policies for making federally insured student loans. An early inquiry to the student's bank is advisable. Six to eight weeks are usually required to process this loan.

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

#### Financial Aid for Minority Graduate Students

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

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

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

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

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

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

Title of Appointment	One Month	Academic Year	· .
Teaching Aisstant	\$ 441	\$ 3,969	Premaster*
Research Assistant	405	3,645	or Intermediate*
Graduate Staff Assistant	405	3,645	or Candidate*
Predoctoral Teaching		•	
Associate I	472	4,248	Intermediate
Predoctoral Research			or Candidate
Associate I	431	3.879	
Predoctoral Staff Associate	431	3,879	
Predoctoral Teaching		· .	
Associate II	503	4.527	
Predoctoral Research		•	Candidate
Associate II	462	4.158	
Predoctoral Staff Associate II	462	4,158	-

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

# UNIVERSITY RESEARCH

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

#### Statement on University Research Policy

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

The principle of indivisibility of teaching and research has been clearly enunciated on many occasions and in both scholarly and political documents. As an example of the latter, we have the statement in the report of the President's Science Advisory Committee of 1960<sup>1</sup> 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<sup>2</sup> characterizes the central purpose of American universities by the statement that this purpose is "the advanced education of American youth integrated with the scholarly activities of teachers; in the natural sciences these activities take primarily the form of scientific research."

It is the aim of the University to adhere closely to these principles, thus executing programs of research and teaching in a large variety of fields of learning in the sciences, humanities, social studies, and engineering. Because it is not possible in any one institution to emphasize all of the vast field of learning uniformly, the 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

1. 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.

<sup>2.</sup> 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.

GRADUATE STUDY



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

## **Intra-University Scholarly and Research Support**

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

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

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

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

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

### **Special Lectureships and Professorships**

The Walker-Ames Fund was founded in 1931 by Maud Walker Ames and her husband, Edwin Gardner Ames. Its purpose was to enable the University of Washington "to guarantee to the state of Washington the scholarly and educational services of the most distinguished minds available in this and other countries . . ." Since the first Walker-Ames visiting professor was appointed in 1936, well over a hundred notable scholars have come to the University as temporary members of the faculty, enriching the intellectual life of the University community.

The John Danz Fund was established in 1961 by a gift to the University from the late Mr. John Danz and Mrs. Jessie Danz. The funds, in part, are used to bring to the University one or more distinguished scholars "of national and international reputation who have concerned themselves with the impact of science and philosophy on man's perception of the rational universe." The first Jessie and John Danz Lecturer was Sir Julian Huxley, who came to the University from London during Spring Quarter 1962.

Communications relating to the Walker-Ames Fund and the John Danz Fund should be addressed to the 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 throught the University. These are listed below, with some of them being described in greater detail.

#### Alcoholism and Drug Abuse Institute

3935 Fifteenth Avenue Northeast

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

#### Arboretum

Dale Cole, Ph.D., Director, Center for Ecosystem Studies

Joseph A. Witt, Curator of Plant Collections

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

#### Center for Asian Arts

Millard B. Rogers, Ph.D., Director Richard McKinnon, Ph.D., Associate Director 131 Art

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

#### Center for Research in Oral Biology

Leo M. Sreebny, D.D.S., Ph.D., Director Dan G. Middaugh, D.D.S., Assistant Director B528 Health Sciences

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

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

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

#### **Child Development and Mental Retardation Center**

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

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

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

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

## Academic Computer Center

Robert G. Gillespie, B.A., Director Monique Rona, Assistant Director

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

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

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

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

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

#### **Computer Science Laboratory**

Alan C. Shaw, Ph.D., Director 43 Roberts

The Computer Science Laboratory is the research and teaching laboratory for the Computer Science Group. It is used for studies of operating systems and other software and hardware, which, if done on Computer Center equipment, might impede the job flow; and for

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studies that require specialized equipment (e.g., graphics terminals) not supported by the Computer Center.

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

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

#### **Developmental Psychology Laboratory**

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

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

#### Division of Marine Resources

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

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

The University is a Sea Grant College. The division is responsible for the coordination and administration of the interdisciplinary Sea Grant Program. It also administers interdisciplinary research efforts in the Arctic, including the interinstitutional Arctic Ice Dynamics Joint Experiment. The division cooperates with agencies of state and federal government that are concerned with marine matters. Requests for information should be addressed to: University of Washington, Director, Division of Marine Resources, HG-30, 3716 Brooklyn Avenue Northeast, Seattle, Washington 98195.

#### Drug Plant Gardens and Laboratories

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

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

#### Fisheries Research Institute

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

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

#### Friday Harbor Laboratories

A. O. Dennis Willows, Ph.D., Director Richard R. Strathmann, Ph.D., Resident Associate Director Friday Harbor, Washington

University Office: 208 Kincaid

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

Friday Harbor Laboratories are located approximately eighty miles north of Seattle near the town of Friday Harbor on San Juan Island, on a biological preserve of 484 acres of wooded land with about two miles of shoreline. The island is one of the largest of the 172 that make up the San Juan Archipelago located in the northwest section of the state of Washington between Vancouver Island and the United States mainland.

The laboratories are close to 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 and summer, the laboratories offer an opportunity for independent and supervised research, as well as a varied program of instruction for graduate and undergraduate students. Throughout the year, use of the facilities of the laboratories for research in various areas of marine science is encouraged.

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

#### Henry Art Gallery

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

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

#### **Institute for Environmental Studies**

Robert O. Sylvester, S.M., Director Brian W. Mar, Research Coordinator 112 Sieg

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

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

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

#### Institute for Sociological Research

David R. Schmitt, Ph.D., Director 119 Savery

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

#### Institute of Forest Products

James S. Bethel, D.F., Director 115 Anderson

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

#### Institute of Governmental Research

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

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

#### Joint Center for Graduate Study

R. Wells Moulton, Ph.D., Dean 104 Administration Raymond Gold, Ph.D., Resident Director Richland, Washington

The Joint Center for Graduate Study, located at Richland, Washington, is an off-campus facility operated by the University of Washington and Washington State University, with Oregon State University participating in the academic program. The facility is available for graduate study and research to students associated with these universities. Course work completed through the center and research performed in the laboratories of contractors to the Atomic Energy Commission, upon approval in advance, may be applied toward the fulfillment of the requirements for certain advanced degrees offered by the University of Washington.



Currently, graduate-level and upper-division courses are available in biology, business administration, chemistry, computer science, education, librarianship, mathematics, physics, radiological sciences, and in chemical, ceramic, electrical, mechanical, metallurgical, and nuclear engineering. Atomic Energy Commission-owned laboratory facilities, operated by various prime contractors to the Atomic Energy Commission, are available for research purposes on an individual basis and provide an exceptional opportunity to do research work requiring facilities not available at most colleges and universities. A limited amount of financial support is available through the Richland Graduate Fellowship program for students of advanced standing in support of Master of Science thesis or doctoral dissertation research to be performed at Richland. A limited amount of financial support is also available for faculty members desiring to do research at the center.

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

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

#### Laboratory of Radiation Ecology

Allyn H. Seymour, Ph.D., Director 104 Fisheries

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

#### **Nuclear Physics Laboratory**

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

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

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

Research in nuclear engineering and allied fields is undertaken.

#### **Oceanographic Research Vessels**

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

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

#### **Office of Scholarly Journals**

Emily Johnson, Director Parrington Annex 7

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

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

Organization for Tropical Studies

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

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

#### **Pacific Northwest 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**

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

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

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

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

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

#### **Radio Station KUOW and KCTS-TV Station**

Kenneth Kager, Manager, KUOW 325 Communications Dr. Richard J. Meyer, General Manager, KCTS/9 Television 159 Drama-TV Besides providing a public service, these stations train students in communications.

#### **Regional Primate Research Center**

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

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

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

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

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

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

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

#### Speech and Hearing Clinic

Phillip A. Yantis, Ph.D., Director 1320 Northeast Campus Parkway

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

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

The museum is an educational and cultural center whose function is to collect, preserve, research, exhibit,

## and interpret the natural and cultural objects of the human environment, particularly the Pacific Ocean, its islands, and mainland shores. Museum divisions are anthropology, education, exhibition, geology, and zoology. Graduate training in the museum includes a program that leads to a Master of Arts degree in the field of anthropology with a specialization in museology.

#### University Hospital

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

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

#### University of Washington Press

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

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

The press backlist now includes about five hundred fifty titles in print, with special emphasis on art, anthropology, Asian studies, biology, ethnology, history and government, language and literature, oceanography, and regional subjects. The press publishes about fifty new books each year, both by members of the University faculty and by scholars outside the University. The press has a paperback reprint series called Washington Paperbacks; a continuing clothbound reprint program, including the Americana Library series, to make available again standard out-of-print works of scholarship; and an import program, the purpose of which is to make known to American scholarship important books

### GRADUATE STUDY

in English published abroad. The press is also publisher of the American Ethnological Society Monographs, which now number more than fifty volumes. The press also publishes a variety of audiovisual educational materials, most of which grew out of original research on campus. These materials include film strips, disk recordings, and language tapes. All books published by the press are now also available in microfiche form.

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

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

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

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

#### Wind Tunnel

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

This facility is a research tool for low-speed aerodynamics. It also provides a public service to industry and gives students a practical industrial experience.



# CONTINUING EDUCATION

Dean Lloyd W. Schram 201 Smith

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

It is continuously expanding and changing to accommodate these needs.

Continuing Education collaborates with all the continuing education units on campus, most of which are attached to the various schools and colleges, including the professional schools. Coordination of activities is facilitated through the Continuing Education Committee of the University and through the new Health Sciences Continuing Education Committee. An increasingly prominent role of Continuing Education is to serve as an instrument facilitating the development of interdisciplinary programs designed to bring University knowledge and competence to bear on special community needs.

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

#### **Division of Evening and Extension Credit Programs**

Acting Director Barbara V. Williams 222 Lewis

University residence credit courses open to all regularly admitted students are offered during late afternoon and evening hours by the Division of Evening and Extension Credit Programs. Approximately two hundred such classes are offered each quarter of the academic year. A special effort is made in the evening program to provide courses and degree opportunities for persons who are unable to attend classes during the day.



In an experimental program begun Autumn Quarter 1972, the College of Arts and Sciences, through Continuing Education, offers an opportunity to earn a traditional University baccalaureate degree in the evening. At present, it is possible to earn a degree in communications, economics, history, mathematics, or psychology without attending any classes before 5:30 p.m. All evening credit courses may be applied toward a baccalaureate degree. A person interested in developing a major as a part-time student should plan a course of study with the assistance of an adviser.

#### Extension Credit Classes

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

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

#### Independent Study Through Correspondence

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

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

# **Division of Extension Services**

Director Jerry L. Kelley 319 Lewis

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

#### Noncredit Studies

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

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

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

#### Short Courses and Conferences

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

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

#### **Residential Seminars**

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

#### Lectures and Concerts

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

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

#### Telecourses

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

#### Radio Broadcast Services and KUOW

Radio KUOW broadcasts programs of an educational, cultural, scientific, informational, or public affairs nature and communicates information concerning University affairs to students, alumni, and the public. The station also supplies students in the School of Communications with actual experience in preparation for careers in radio. In addition, the station possesses a subcarrier capability, known as the SCA channel, through which experimental programs can be designed to test and develop new broadcasting and teaching techniques, sometimes in combination with other media or delivery systems. The SCA is currently in regular use to provide special services for the blind. Effective radiated power of eighty-six kilowatts carries the signal to most of western Washington on a frequency of 94.9 MHz.

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

Division of Community and Organization Development Director

Daniel W. Shannon 316 Lewis

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

#### **Continuing Arts Education**

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

#### Title I, Higher Education Act of 1965

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

#### Women's Programs

Through individual counseling and specialized group guidance, women facing a variety of life decisions are



assisted in focusing their resources for creative change. Courses and seminars to explore areas of educational and vocational choice are offered regularly. Field research and internships provide direct experience in selected fields.

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

Lake Wilderness Continuing Education Center

The center, maintained by the University of Washing-

ton, has served for the past seven years as a remote retreat at Lake Wilderness in Maple Valley for the purpose of augmenting on-campus educational facilities. The center is operated under the supervision of Continuing Education and is used by faculty, staff, students, governmental agencies, and other educational institutions for seminars, short courses, conferences, and workshops. The center can accommodate forty persons for overnight conferences and more than one hundred for daytime meetings. Additional information can be obtained by telephoning (206) 543–5380.

# PROGRAMS OF STUDY



# ARCHITECTURE AND URBAN PLANNING

Dean Lee G. Copeland

Associate Dean

Norman J. Johnston

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

In a time of great competitive interest in the forms, directions, and character of environmental development and appropriate allocation of resources, today's professionals must have a sense of these issues and must create buildings, cities, and landscapes that not only serve their functions but also reflect and enhance the values and aspirations of the societies for which they have been created. As part of a university located in the heart of the major urban area of the Pacific Northwest, the college is able to use its environment as a laboratory for study. It also works closely with both the academic and the professional worlds to build its curriculums and faculty with the objective of serving the needs of students who one day will be responsible for interpreting our environmental needs. The presence of the four professional areas within the college is an acknowledgment of the mutual interests and responsibilities of these fields in the creation of an appropriate contemporary environment.

The college's programs in architecture and landscape architecture are accredited, respectively, by the National Architectural Accrediting Board and the American Society of Landscape Architecture. The Department of Architecture has been a member of the Association of Collegiate Schools of Architecture since 1925; the Department of Landscape Architecture holds membership in the National Council of Instructors of Landscape Architecture; the Department of Urban Planning is a member of the Association of Collegiate Schools of Planning and has been granted recognition by the American Institute of Planners; the Department of Building Construction is a member of the Associated Schools of Construction.

5.1

#### **Facilities and Services**

The College of Architecture and Urban Planning occupies two buildings on the campus. Architecture Hall originally was the art gallery for the 1909 Alaska-Yukon-Pacific Exposition, and it is the only remaining permanent building that was used by that event. Today, the college uses it for classrooms, design laboratories, seminar rooms, and faculty offices. Gould Hall, built specifically for the college, was first occupied in 1971. Designed around a great skylighted central court that serves as a dramatic focal space, the building houses the Dean's office and the college's four departments, with their classrooms, seminar rooms, design and research laboratories, and faculty and departmental offices. In addition, it contains various specialized facilities, including an extensive shop and a photographic laboratory. Gould Hall houses the college's library, a branch of the University Library, and its collection of materials related to the college's programs. Included are approximately 15,300 volumes, 14,400 pamphlets and unbound reports, 28,000 current periodicals, and 28,000 35-millimeter slides, as well as a large file of manufacturers' catalogs and brochures.

#### Honorary and Professional Societies

The college has two honorary societies specifically formed to recognize scholastic achievement within the college's professional degree programs: Tau Sigma Delta for students in architecture and allied arts, and Sigma Lambda Chi for those in building construction. In addition, various departmental student organizations strengthen the relationships between students, classrooms, and the professions.

#### Scholarships and Financial Aids

Departmental scholarships and awards are given annually to undergraduate students who demonstrate outstanding scholastic ability and general excellence and show financial need. These awards are announced in the Spring Quarter for the following academic year. Teaching assistantships are available for graduate students in architecture and in urban planning. Some additional fellowship and scholarship support is available for graduate students in urban planning. Inquiries should be directed to the respective departments.

#### **Undergraduate Programs**

Besides satisfying the usual requirements at the high school level for admission to the University, students who plan to enter the College of Architecture and Urban Planning should have taken a semester of trigonometry. Courses in the humanities, the social sciences, and freehand drawing are strongly recommended as electives. On entering the University, students enroll in one of its several colleges or schools, whether or not an academic major has been chosen. Students majoring in building construction may enroll directly in the College of Architecture and Urban Planning. Entering freshmen planning on majoring in architecture, landscape architecture, or urban planning must spend the first two years as premajors in the College of Arts and Sciences. Upon successful completion of the departmental requirements of those first two years, they apply for transfer to the College of Architecture and Urban Planning.

Admission to the college is highly competitive, and enrollment preference is given to those applicants who, in the judgment of the University, are the best qualified to undertake its programs. The departments of the college can answer any inquiries about their admission procedures.

#### **Graduate Programs**

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

Within the college, graduate degree programs lead to the degrees of Master of Architecture, Master of Urban Planning, or Doctor of Philosophy in the field of urban planning. The departments of Architecture and Urban Planning coordinate a master's program with a specialization in urban design. Students who intend to work toward one of these degrees must apply for admission to the appropriate department of the College of Architecture and Urban Planning and to the Graduate School and must meet the requirements outlined in the "Graduate Study" section of this catalog.

Additional information on any aspect of the college's departmental programs can be obtained from the department in which the student has an interest.

# ARCHITECTURE

208 Gould

The role of architecture is to improve the human condition through the development and application of design skills that modify the physical environment. By common consent, the architect, as one of a network of design professionals, normally operates at the building and building-complex scale; thus, while larger or smaller design issues sometimes are his province and almost invariably bear on his task, the design of buildings and building complexes constitutes the distinct focus of that task.



The architectural profession has always included a certain number of relatively constant concerns: for logical planning, for technical soundness, for artistic aspects of the design, and for verbal elucidation of the theory and history of the field. These are general characteristics. In addition, the task at any particular time is distinct in certain ways. In the present, and very likely in the near future, architects are distinct in their possession of a sense of the detailed and complex interactions between man and his environment; a concern for service to all components of society; an interest in technical and technological innovation; a concern with the building's impact on ecological balance; and a desire to enlarge the applicability of new design tools.

#### Faculty

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

#### **Undergraduate Program**

## Bachelor of Arts in Environmental Design Degree

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

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

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

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

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

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

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

## **Graduate Program**

#### Master of Architecture Degree

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

Primary criterion for admission to the graduate program is the applicant's apparent ability, as determined by the department and the Graduate School, to progress satisfactorily in that program. The applicant's scholastic record in courses taken during the junior and senior years is of major importance. Consideration also is given to other evidence that may be available.

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

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

# BUILDING CONSTRUCTION 208 Gould

The objective of the building construction program is to develop individuals for management or technical positions in the building industry or related businesses or for management of their own business operations. Many areas of activity—development, design, construction, government, and supporting industries—need individuals with technical competence who have a basic knowledge of, and concern for, architecture and building. Developers must have skilled persons for project promotion, financing and design, and construction liaison. The design professions require business managers and construction supervisors. Construction companies use construction managers, supervisors, and business managers. Supporting industries, because of mass demand and revolution in building techniques, seek skilled individuals for materials and product research, for material distribution and sales, and for material and product production. Government at all levels, with its expanding role in the building industry, requires personnel in design and construction liaison, building and contract document analysis, building finance, and code establishment and enforcement. The building construction program attempts to prepare students for these areas.

#### Faculty

Marvin J. Flaherty, Acting Chairman; Bayley, Eberharter, Sakuma, Short, 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.

*Core Courses:* B CON 301, 310, 330, 331, 332, 401, 402, 410, 420; ARCH 320, 321, 322, 420, 421, 422, 430, 431, 432.

*Required Courses:* MATH 105, 124, 125; 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, 340; Q METH 200, 201; CIVE 366; OPSYS 301; ENGR 161; URB P 400.

*Electives:* 21 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 the society in which he lives. 20 credits may be selected in third and fourth years to complement and strengthen the student's specific area of interest within the field of his major.

*Credits:* 192 total credits are required for graduation, with a 2.30 cumulative grade-point average and a 2.50 grade-point average in all departmental courses.

# LANDSCAPE ARCHITECTURE

## 348 Gould

The expanded role and opportunities for the landscape architect are directly related to the increasing public concern in conservation, recreation, and open-space planning and design for cities and suburbs. This trend places great demand on schools of landscape architecture to train professionals who can deal with the range of landscape problems affecting environmental quality in and around the urbanizing centers. Landscape architecture is primarily concerned with the planning and design of the out-of-doors. The profession seeks to balance man's social, psychological, and physical out-ofdoor needs with the requirements of a properly functioning natural environment. Landscape architects are concerned with understanding and protecting the natural environment, and they seek methods to integrate human needs through an understanding of natural processes.

Landscape architects may be private practitioners or may be employed by various planning agencies, industrial firms, educational institutions, or public agencies. Their work varies from large-scale land- and water-use master planning to specific landscape projects. Tasks performed by landscape architects include preparation of site analysis, feasibility studies, alternative landscape plans, project designs, working drawings, specifications, cost estimates, and construction supervision. Landscape architects are assuming a guiding role in the development and conservation of regional resources and in the protection of natural and man-made landscapes.' They are becoming increasingly involved in the decision-making process affecting large areas of public lands for parks, recreation, open space, new town and subdivision design, urban design, and transportation corridor selection.

#### Faculty

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

#### **Undergraduate Program**

#### Bachelor of Landscape Architecture Degree

The five-year curriculum leading to the Bachelor of Landscape Architecture degree is the normal qualification for the professional practice of landscape architecture. Students take the first two years of the curriculum in the College of Arts and Sciences or its equivalent in a community or four-year college, satisfying the following distribution and elective requirements:

A minimum of 20 credits each in social sciences, humanities (including 3 credits in art laboratory), and natural sciences (including GEOL 101; BIOL 101–102;



BOT 111, 112, 113); 3 credits plane surveying; ARCH 300, 301, 310, 311, 312; 9 credits in art laboratories (plus those in humanities) selected from ART 105, 106, 107, 109, 110, 129, 259, 272. Total: 90 credits.

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

Students admitted as departmental majors must satisfy the following:

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

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

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

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

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

Satisfaction of the professional curriculum for graduation requires completion of the curriculum's 235 credits with a 2.30 cumulative grade-point average and a 2.50 grade-point average in all required departmental courses.

## **URBAN PLANNING**

410 Gould

Urban planning is concerned with the rational organization and use of man-made environments and is based on an understanding of institutions, technology, and human aspirations and opportunities. It makes its contribution in the integrated application of knowledge from diverse fields. Planners conduct research on the nature of man-made environment and change, as well as work in the formulation of community programs dealing with human resource objectives. They develop alternatives, propose solutions to environmental and community problems, and develop and apply methods for evaluating alternatives. Planners exercise responsibilities for the administration of programs to prepare plans and to carry them into effect.

#### Faculty

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

#### **Undergraduate Program**

#### **Bachelor of Arts in Urban Planning Degree**

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

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

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

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

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

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

## **Graduate Programs**

#### Master of Urban Planning Degree

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

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

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

The department also offers, in collaboration with the Department of Architecture, an urban design speciali-

zation at the master's degree level focusing on urban design theory, policy, process, and implementation.

#### **Doctor of Philosophy Degree**

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

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

For graduation, the program has a minimum of fixed requirements in the Department of Urban Planning in addition to those of the Graduate School. A preliminary examination may be required before a Supervisory Committee is appointed to direct the student's specialized preparation for the General Examination, the first of two major requirements. The second is completion of a satisfactory dissertation and Final Examination.



# ARTS AND SCIENCES

#### Dean

George M. Beckmann B110 Padelford

Associate Deans

Aldon D. Bell George C. Buck Joe S. Creager Ronald Geballe Morton Kroll William L. Phillips Walter L. Riley

A liberal education shapes man toward informed judgment and participation in a democratic society. The individual's acquaintance with both past and contemporary thought in the arts and sciences, his exploration of abstract ideas and their relationships, and his ability to manipulate them are the primary concern of the College of Arts and Sciences.

The college offers breadth and depth in the intellectual experience, unlimited by vocational or professional considerations. The departments and schools offer nearly one hundred curricula leading to the degrees of either Bachelor of Arts, Bachelor of Fine Arts, Bachelor, of Music, or Bachelor of Science, as well as graduate study leading to master's and doctoral degrees.

Although some common patterns of study are required

of all students, the objectives of the college permit a wide variability in education aims. Certain units of the college combine professional training with general study, but any special goals of a professional or vocational nature are regarded as extensions of the basic bachelor's program.

The College of Arts and Sciences provides instruction to students in every unit of the University. Preprofessional programs are designed to enrich the general education of students who will enter the College of Architecture and Urban Planning, the College of Education, or the schools of Business Administration, Dentistry, Law, Librarianship, Medicine, Public Affairs, or Social Work. Students enrolled in other undergraduate colleges of the University are often required to take a large part of their work in courses given in the College of Arts and Sciences, and they may elect additional courses as their degree programs permit.

# UNDERGRADUATE PROGRAMS

#### Admission to the College

For general University admission requirements, see "Undergraduate Education" section of this catalog.

#### **Recommended High School Preparation**

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

Students who include four years of English, at least three years of a single foreign language, and at least three years of college preparatory mathematics in their high school programs meet the basic proficiency requirement of the college degree program upon entrance to the University and are thus exempt from the 15 credits of courses in these areas normally required of students as part of their first year in the college.

In addition, intensive preparation in a particular academic area may be appropriate for students who have specific educational objectives. For example, students who expect to complete a major in mathematics or the physical sciences are generally urged to complete all of the standard mathematics courses offered by their high schools in order to avoid taking review courses for which no college credit is given. Students who expect to complete major programs in chemistry, geological sciences, mathematics, oceanography, or physics should examine the preparations for admission suggested by these departments.

#### **Graduation Requirements**

To be awarded a baccalaureate degree, a student in the college must fulfill a basic proficiency requirement, a distribution requirement, and a major requirement.

#### **Basic Proficiency Requirement**

Students of the college are expected to have developed, either in their high school study or early in their college study, fundamental proficiencies in the use of English and one foreign language and ability in quantitative reasoning. These capabilities will make advanced study more efficient and meaningful for the student, and requiring competence in them from all students will enable the faculty to assume a minimum level of verbal and mathematical abilities in their courses. Although achievement in these skills is made a part of the degree requirements, many entering students will already have demonstrated an acceptable level of achievement in their high school study. Students whose high school preparation included four years of English, three years of a single foreign language, and three years of college preparatory mathematics are considered to have satisfied the basic proficiency requirement. They may, of course, wish to take additional courses in these fields as electives.

A student who does not satisfy the basic proficiency requirement in this way will be expected during the first year in residence to complete 15 credits in the areas of verbal or mathematical skills, or both, that the student and the academic adviser consider most appropriate to the student's needs and interests. He may choose to emphasize one skill or refurbish more than one skill, as his assessment of his own capabilities may dictate. Ordinarily, courses used to satisfy this requirement are chosen from English composition, foreign language, and mathematics. Advanced credit awarded in English, foreign languages, or mathematics on the basis of entrance or placement examinations may be used in the satisfaction of this requirement.

Students who enter the College of Arts and Sciences with 85 or more acceptable transfer credits and students who have completed the general education requirements of other accredited colleges or universities are not required to take any additional proficiency courses. However, they may not count any proficiency courses already taken (up to 15 credits) toward the distribution requirement unless they are exempt from the proficiency requirement on the basis of their high school study.

#### **Distribution Requirement**

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

Most of the courses offered in the college, and certain courses offered in other units of the University as well, have been divided into three large fields of knowledge: the humanities, the social sciences, and the natural sciences. Each student must select, preferably with the approval of his adviser, at least 20 credits in courses from each of the three fields on the following distribution list. No course from the department in which the student is pursuing his major field of study may be used to satisfy this requirement. Courses presented to satisfy the basic proficiency requirement may not be counted toward the distribution requirement.

#### Major Requirement

Among the characteristics of thought that the College of Arts and Sciences attempts to develop in students are (1) the abilities to manipulate abstract ideas and to explore relationships deeply, (2) confidence in the power of their own intellects, and (3) awakened intellectual curiosity. These attributes come from thorough study of a subject, aimed at developing a depth of knowledge. This study leads them to both empirical and theoretical considerations, develops in them a

ARTS AND SCIENCES



# DISTRIBUTION LIST

#### HUMANITIES

Minimum of 20 credits required, all outside the major

Anthropology: ANTH 333, 334, 335, 403, 429, 41, 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 Languages and Literature: All undergraduate courses

Biomedical History: BI HS 401, 419, 420, 430

Classics: All undergraduate courses except LAT 475

Communications: CMU 321, 324, 326, 373

Comparative Literature: All undergraduate courses

Drama: All undergraduate courses

Drama-Dance: DRDNC 101, 102, 103, 201, 202, 203, 301, 302, 303, 401, 402, 403

East Asia: EASIA 240

English: All undergraduate courses

General and Interdisciplinary Studies (GIS): Courses as designated each quarter

Germanic Languages and Literature: All undergraduate courses History: HST 307, 311, 312, 411, 412; HSTAA 402, 454; HSTAM 334, 452, 453; HSTAS 401, 402; HSTEU 401, 405, 406, 407, 421

Home Economics: HEC 240 or 347; 321, 322, 329, 429, 432, 433

Humanistic-Social Studies: HSS 351, 352, 450, 451, 461, 471, 472, 480 Humanities: HUM 103

Librarianship: LIBR 451 or 453; 470

Linguistics: LING 101–102–103, 200, 201, 333, 400, 401, 404, 405, 406, 443, 455

Music: All undergraduate Music and Music Applied courses except MUSIC 136, 137, 138, 139, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 236, 237, 240, 241, 250, 321, 324, 325, 326, 327, 328, 340, 431, 432, 433, 434, 435, 436, 440, 441, 442, 443

Near Eastern Languages and Literature: All undergraduate courses

Philosophy: All undergraduate courses *except* PHIL 110, 113, 120, 230, 231, 260, 332, 334, 370, 410, 414, 460, 463, 464, 465, 466, 470, 472, 473, 474

Physical and Health Education: DANCE 283, 364

Romance Languages and Literature: All undergraduate courses

Russia and East Europe: REEU 243, 403

Scandinavian Languages and Literature: All undergraduate courses except SCAND 370, 380, 381

Slavic Languages and Literature: All undergraduate courses

South Asia: SASIA 291, 472, 473

Speech: SPCH 100, 101, 102, 103, 140, 203, 220, 222, 240, 305, 320, 345, 347, 349, 400, 420, 421, 424, 440, 442, 444

#### SOCIAL SCIENCES

#### Minimum of 20 credits required, all outside the major

Anthropology: All undergraduate Archaeology courses and all undergraduate Anthropology courses *except* ANTH 333 334, 335, 403, 429, 431, 450, 455, 456, 457, 458, 459, 466, 467, 468, 486, 487, 488, 493, and *except* Physical Anthropology courses

Architecture and Urban Planning: URB P 482, 485

Biomedical History: BI HS 414, 417, 418, 422, 424, 432, 433, 434

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

Communications: CMU 150, 200, 201, 202, 203, 220, 226, 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, 480

General and Interdisciplinary Studies (GIS): Courses as designated each quarter

Geography: All undergraduate courses

History: All undergraduate courses *except* HST 311, 312, 411, 412, HSTAA 402, 454, HSTAM 334, 452, 453, HSTAS 401, 402, HSTEU 401, 405, 406, 407, 421

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

Humanistic-Social Studies: HSS 310, 320, 410, 419, 420, 421, 422, 431 Inner Asia: All undergraduate courses

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

Philosophy: PHIL 110, 113, 230, 231, 260, 332, 334, 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* PSYCH 102, 200, 213, 217, 218, 222, 231, 232, 233, 406, 409, 416, 417, 421, 422, 423, 425, 475 Russia and East Europe: All undergraduate courses *except* REEU 243, 403

Scandinavian Languages and Literature: SCAND 370, 380, 381 Social Science: SOC S 150

Sociology: All undergraduate courses except SOC 223

South Asia: All undergraduate courses except SASIA 291, 472, 473 Spanish: SPAN 121

Speech: SPCH 230, 235, 270, 329, 335, 339, 373, 425, 426, 428, 471, 472, 473

Women Studies: WOMEN 310

#### NATURAL SCIENCES

Minimum of 20 credits required, all outside the major

Anthropology: All undergraduate Physical Anthropology courses

Astronomy: All undergraduate courses

Atmospheric Sciences: All undergraduate courses

**Biochemistry: All undergraduate courses** 

**Biological Structure: B STR 301** 

Biology: All undergraduate courses (and either BIOL 100 or 103, see course descriptions in volume 2 for details)

Biomedical History: BI HS 415, 416, 431

Botany: All undergraduate courses

Chemistry: All undergraduate courses

Civil Engineering: CEWA 450, 466

Engineering: ENGR 305, 307, 308

Environmental Studies: ENV S 210

Fisheries: FISH 101

General and Interdisciplinary Studies (GIS): Courses as designated each quarter

Genetics: All undergraduate courses

Geological Sciences: All undergraduate courses

Home Economics: H EC 307, 407, 408, 415

Mathematics: All undergraduate courses except MATH 101, 104, 497

Microbiology: MICRO 101, 301, 302, 400

Oceanography: All undergraduate courses except OCEAN 110, 111, 112

Philosophy: PHIL 120, 370, 470, 472, 473, 474

Physical and Health Education: PE 325, 331, 332, 480

Physics: All undergraduate courses

Psychology: PSYCH 102, 200, 213, 217, 218, 222, 231, 232, 233, 406, 409, 416, 417, 421, 422, 423, 425, 475

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

Speech: SPCH 300, 301, 415

Zoology: All undergraduate courses

method of independent study, and exposes them to significant problems yet unsolved. The college provides, through a "major" requirement, the means to satisfy these liberal purposes, as well as the desire of students to become proficient in some field. This part of the student's program is determined by the department, school, or faculty committee with which the major study is pursued. Measured in academic credits, the "major" required of each student consists of a minimum of 50 prescribed credits in a department of the college or a closely related group of departments. Descriptions of major programs are printed under "Undergraduate and Graduate Major Programs."

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

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

#### **General Information About Graduation**

Students should apply for the bachelor's degree no later than the first quarter of their final year. They may choose to graduate under the graduation requirements of the General Catalog published most recently before the date of entry into the college, provided that no more than ten years have elapsed since that date and that approval of the major department has been obtained. As an alternative, a student may choose to fulfill the graduation requirements as outlined in the catalog published most recently before the anticipated date of his graduation. All responsibility for fulfilling graduation requirements rests with the student concerned. A student graduating from another college of the University who wishes to receive a degree simultaneously from the College of Arts and Sciences must receive approval from the associate dean of the College of Arts and Sciences (B10 Padelford) at least three quarters before completing the requirements for the degree from this college. No student may graduate from the College of Arts and Sciences without a minimum of three quarters of attendance in the college.

A student graduating from the College of Arts and Sciences may count a maximum of three 1-credit 100-level physical education courses taken at the University of Washington, or their equivalents at other collegiate institutions, as elective credits toward graduation. Such credits may be counted, however, only if earned in Autumn Quarter 1970 or thereafter. Up to 18 credits in upper-division ROTC courses may also be counted as elective credits toward graduation, but no lower-division ROTC credits may be counted.

## Office for Undergraduate Studies

## C14 Padelford

### Aldon D. Bell, Director

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

# 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 is sometimes competitive.

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

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#### **Atypical Major**

#### C14 Padelford

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

#### **General and Interdisciplinary Studies (GIS)**

#### C14 Padelford

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

#### **College Honors Program**

#### C14 Padelford

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

To be considered for admission at entrance, students must submit during their final high school semester an application to the director of honors. Selection is based on high school records and scores on such examinations as those administered by the College Entrance Examination Board, National Merit, and the Washington Pre-College Testing Program. A periodic reclassification based on academic performance at the University makes possible the later admission of students who were not permitted membership at entrance.

Honors students are counseled by honors advisers. During their freshman and sophomore years, they are expected to arrange approximately one-third of their schedules in honors courses. A student becomes a candidate for an honors degree upon acceptance, usually during the junior year, by a department that offers an honors curriculum. Information on departments that offer honors curricula is given in the section on "Undergraduate and Graduate Major Programs." Students are graduated "With College Honors" in the appropriate discipline. Students who are not members of the college honors program but demonstrate superior abilities in a particular field of study may, with the approval of the appropriate major department, participate in a departmental honors curriculum and receive a departmental honors degree "With Distinction" in the major field.

#### Residential Program

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

#### **Certification for Teaching**

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

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

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

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

#### **Graduate Programs**

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

Students who intend to work toward advanced degrees must apply for admission to the Graduate School and must meet the general requirements outlined in the "Graduate Study" section of this catalog, as well as the requirements established by the graduate faculty in the department or unit offering the degree program. Graduate students must satisfy the requirements for an advanced degree that are in force at the time the degree is to be awarded. Additional information appears in the "Undergraduate and Graduate Major Programs" section of this catalog and in the University of Washington *Graduate Study and Research* bulletin.

# Undergraduate and Graduate Major Programs

# AFRICAN STUDIES

**102 Lewis Annex** 

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

Rene Bravmann, Chairman

# AMERICAN INDIAN STUDIES

C130 Padelford

American Indian studies has as its goals an increased relevance of academic education for American Indian students; promotion of interest in American Indian communities and Indian cultures; and an increased awareness and education of non-Indians about these communities and cultures. To achieve these goals, the University offers a series of courses on American Indian culture, history, and contemporary issues, with emphasis on developing knowledge and understanding of American Indian traditional, sociological, philsophical, and esthetic aspects from the Indian viewpoint. Students interested in a bachelor's degree program centering on American Indian studies should consult a General Studies adviser in B10 Padelford.

Marilyn Bentz, Acting Director

# AMERICAN STUDIES

C14 Padelford

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

# ANTHROPOLOGY

345 Savery

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

#### Faculty

Robert C. Dunnell, Chairman; Amoss, Atkins, Casteel,

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

#### Undergraduate Programs Bachelor of Arts Degree

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

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

Honors Program: Bachelor's degree "With College Honors in Anthropology" or "With Distinction in Anthropology." The honors adviser must be consulted about requirements.

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

# **Graduate Programs**

#### Master of Arts Degree

Admission Requirements: An undergraduate major in anthropology is not required. Applicants are judged on overall undergraduate performance and by the recommendations of professors who have supervised them. Students are admitted only to the Doctor of Philosophy degree program, for which the Master of Arts degree program is a preparatory stage. Admission to pursue a Master of Arts degree program with specialization in museology does not constitute acceptance to proceed to a Doctor of Philosophy degree in anthropology.

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

#### Doctor of Philosophy Degree

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

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

# 

104 Art

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

#### Faculty

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

#### **Undergraduate Programs**

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

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

# **Bachelor of Arts Degree**

#### MAJOR REQUIREMENTS

General Art: ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203; 41 credits chosen from the following optional fields so that one option includes no more than 15 credits and the others no more than 9 credits each: ART 301, 302, 303, 304, 305; all undergraduate art history courses except ART H 201, 202, 203; ART 201, 202, 203, 353; 250, 253, 254, 255, 340; 265, 325; 205; 357, 358, 359, 457, 458, 459; 339; 256, 257, 259, 307, 360; 350, 351, 450; 272, 274, 332.

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

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

#### Bachelor of Fine Arts Degree

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

## MAJOR REQUIREMENTS

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

*Graphic Design:* ART 105, 106, 107, 109, 110, 129; ART H201, 202, 203; ART 205, 206, 207, 313, 314, 366, 367, 368, 410, 466, 467, 468, 479, 480; 30 elective art credits.

Industrial Design: ART 105, 106, 107, 109, 110, 129;

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

Interior Design: ART 105, 106, 107, 109, 110, 129, 262; ART H 201, 202, 203, 478, 479; ARCH 150, 151, 300, 301; ENGR 123; ART 259, 263, 265, 310, 311, 312, 319, 320, 321, 472, 473, 474; 18 elective art or humanities credits; H EC 125, 329 or ART 250.

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

Painting: ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203, 381, 3 elective art history credits; ART 265 (9 credits); 256, 257 (6 credits), 259, 307 (6 credits), 309, 360 (9 credits), 463 (18 credits) or 325 (9 credits for 9 credits of 463); 18 studio art elective credits; 21 elective credits from art or art history, or both.

*Printmaking:* ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203, 392; ART 350, 351 (6 credits), 450 (15 credits), 451 (15 credits); 256, 257 (6 credits), 265 (9 credits), 272 (6 credits), 307 (6 credits), 360 (9 credits); 20 elective art credits.

*Sculpture:* ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203, 2 elective art history credits; ART 272 (6 credits), 274, 332 (15 credits), 335, 337, 436 (15 credits); 253, 256, 257, 265 (6 credits); 27 elective art credits.

#### **Graduate Programs**

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

#### Master of Arts Degree (Art History)

Admission Requirements: Credentials from a university art history department whose standards are recognized by the School of Art; three letters of recommendation; demonstration of competence in French or German; submission of written work in the history of art.

Graduation Requirements: 36 credits in the history of art in courses numbered 400 or above, of which 27 are course credits and 9 are thesis credits (half of the 36 credits must be in courses numbered 500 or above); passing of a comprehensive examination in art history at the level of a sound general survey; presentation and defense of a thesis, which may be the extension of a seminar paper that demonstrates a familiarity with sources and a capacity for synthesis and critical evaluation.

#### Master of Fine Arts Degree (Studio Arts)

Admission Requirements: Same as the undergraduate degree requirements in art in the School of Art, with a 3.00 or better grade-point average in the undergraduate art major; presentation of samples of work completed during undergraduate study; three letters of recommendation.

Graduation Requirements: A minimum of 36 credits of scheduled class work and 9 credits of thesis. The thesis is in the nature of a project, such as a series of paintings, prints, sculptures, ceramic objects, or designs in metal or fabric, executed with background or research. A selection of the thesis may be reserved for inclusion in the annual thesis exhibition. Undergraduate work beyond the basic minimum may be required to make up deficiencies. There is no foreign-language requirement.

#### Master of Arts for Teachers Degree

Admission Requirements: Bachelor of Arts degree in the field of art education or equivalent, with a 3.00 or better grade-point average in the undergraduate major; completion of at least one year of successful teaching on the elementary, secondary, or college level prior to initial entry; presentation of samples of the applicant's work and that of his or her students; three letters of recommendation.

Graduation Requirements: A minimum of 36 credits, composed of a core of art education seminars and studio courses, of which 9 may be a thesis related to the field. Additional course work, including a research study, may be taken in lieu of the thesis. Undergraduate work beyond the basic minimum may be required to make up deficiencies. There is no foreign-language requirement.

Graduate students in the studio fields and in art history may participate in the School of Art's study abroad programs.

# ASIAN AMERICAN STUDIES

A517 Padelford

Asian American studies is an interdisciplinary program intended to transmit the history and culture of people of Asian descent in the United States. As currently struc-

#### ARTS AND SCIENCES



tured, the program has courses in general and interdisciplinary studies, Asian languages and literature, and psychology. The "College of Education" section of this catalog has information for students with teaching majors or minors in Asian American studies. In addition, students interested in a bachelor's degree program centering on Asian American studies should consult a General Studies adviser in B10 Padelford.

James K. Morishima, Director

# ASIAN LANGUAGES AND LITERATURE

300 Thomson

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

#### Faculty

Roy Andrew Miller, Chairman; Brandauer, Cirtautas, Cooke, Hiraga, Knechtges, Lukoff, McKinnon, Miller, Niwa, Norman, Nornang, Poppe (emeritus), Potter, Ruegg, Schiffman, Serruys, Shapiro, Shih (emeritus), Suh, Takaya, Thrasher, C-h. Wang, C-n. Wang, Wilhelm (emeritus), Wylie, Yen. J. L. Norman, graduate program adviser.

#### **Undergraduate Programs**

#### **Bachelor of Arts Degree**

Major Requirements: East Asian languages (Chinese, Japanese, Korean, Thai, Tibetan, Turkic)—55 credits in the language, 25 beyond the second-year level; 20 credits in literature and culture of the major language, excluding 499. Literature courses in English may not be counted toward language credit requirements. South Asian languages (Hindi-Urdu, Sanskrit, Tamil)—57 credits in the language, including 39 credits in the major language, 15 credits in the minor language, and INDN 100; 13 area credits in HSTAS 201, 202 and senior seminar; 10 credits in a humanistic discipline with a South Asian focus (e.g., philosophy, comparative literature, history, political science). Ordinarily, majors in Tamil and Hindi-Urdu study Sanskrit as the minor language; with approval, majors in Sanskrit may substitute Pali or Tibetan for the minor language; majors in Tamil may substitute a second Dravidian language if concentrating in linguistics; majors in Urdu may substitute Persian as a minor language. Literature courses in English do not count toward language credit requirements.

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

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#### **Graduate Programs**

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

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Master of Arts Degree

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

Admission Requirement: Bachelor of Arts degree in relevant Asian language or equivalent background.

Graduation Requirements: 45 course credits, of which 18 must be in courses numbered 500 and above, plus 9 thesis credits; proficiency examination in major language; graduate reading examination in one language other than major language; successful completion and defense of thesis. The graduate adviser must be consulted about specific course requirements in the various language areas.

# Doctor of Philosophy Degree

The Doctor of Philosophy degree is offered with specialization in Buddhist studies, Chinese, Japanese, Korean, Tibetan, and Turkic languages and literature.

Admission Requirement: Master of Arts degree in relevant Asian language.

Graduation Requirements: Proficiency examination in language of specialization; graduate reading examinations in one Asian language other than major language and in one European language; field examinations; successful completion and defense of dissertation. The graduate adviser must be consulted about specific course requirements in the various language areas.

## ASTRONOMY

241 Physics

Astronomy deals with the science of the objects making

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

#### Faculty

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

#### Undergraduate Program

### **Bachelor of Science Degree**

Major Requirements: ASTR 321, 322, 323; 431, 432, 433 or 9 units of other astronomy 400- or 500-level courses; PHYS 121, 122, 123; 131, 132, 133; 221, 222, 223; 321, 322; MATH 124, 125, 126, 205, 238; 224, 327, 328; 12 additional credits in courses at 300 level or above in astronomy, physics, or related fields, approved by adviser (PHYS 323, 324, 325; 421, 424, 425, 426 recommended for students planning to do graduate work in astronomy); junior year (survey) and senior year (research) papers recommended as ASTR 499 projects, with emphasis on the senior paper for students planning graduate work. No grade lower than C is acceptable in courses fulfilling the above requirements. Undergraduates interested in advanced work in astronomy may wish to take a double major in astronomy and a related field, such as physics.

#### Graduate Programs

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

#### Master of Science Degree

Admission Requirement: Passage of the departmental preliminary examination with a grade of A or B.

Graduation Requirements: With Thesis—36 approved credits, of which 12 must be in astronomy courses at the 500 level or above and 9 will be thesis research. Without Thesis—36 approved credits, of which 15 must be in astronomy courses at the 500 level or above. For either program, proficiency in one foreign language in which there exists substantial astronomical literature.

#### **Doctor of Philosophy Degree**

Admission Requirements: Passage of the departmental preliminary and qualifying examinations with a grade of A. Entering students are expected to have a strong background in physics and mathematics.

#### ARTS AND SCIENCES



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, Leovy, Liou, Radke, Reed, Untersteiner, Wallace. R. G. Fleagle, graduate program adviser.

#### **Undergraduate Programs**

#### Bachelor of Science Degree

Major Requirements: 38 credits in atmospheric sciences courses numbered above 300, of which 20 must be in courses above 400; ENGR 141; MATH 124, 125, 126; PHYS 121, 122, 123, 131, 132, or equivalents; and two courses from the following: MATH 327, 328, A A 370, PHYS 221, 222, 223; a grade of C or better in each of the required courses in physics and mathematics; overall grade-point average of at least 2.20 in all courses taken in atmospheric sciences.

Honors Program: Bachelor's degree "With College Honors in Atmospheric Sciences" or "With Distinction in Atmospheric Sciences." The honors adviser must be consulted about requirements.

#### **Graduate Programs**

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

#### Master of Science Degree

Admission Requirements: Bachelor's degree in a phys-

ical 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 foreignlanguage requirement. Qualifying examination must be taken at the end of first year of graduate study.

#### **Doctor of Philosophy Degree**

Admission Requirement: Passing the qualifying examination with distinction.

Graduation Requirements: At least half of the credits earned prior to the General Examination should be in courses numbered above 500, and at least 21 credits should be in approved mathematics and physics courses numbered above 400. General Examination and preparation of a dissertation are required.

# BIOCHEMISTRY

J405 Health Sciences

Biochemistry is the study of the chemistry of life proc-

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Hans Neurath, Chairman

#### Undergraduate Programs

No curriculum leads to an undergraduate degree in biochemistry, but students following the Bachelor of Science degree curriculum in biology or chemistry may include in their degree program courses offered by the Department of Biochemistry in the School of Medicine. Courses in biochemistry are of particular interest to undergraduate students in botany, chemistry, genetics, microbiology, or zoology.

#### **Graduate Programs**

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

Students who intend to work toward the Master of Science degree or the Doctor of Philosophy degree in biochemistry should consult the "Graduate Study" and "School of Medicine" sections of this catalog.

# BIOLOGY

220 Johnson

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

# Undergraduate Programs

#### **Bachelor of Science Degree**

Major Requirements: The program leading to a Bachelor of Science degree is in cellular and molecular biology, designed for students who wish to obtain undergraduate training that emphasizes the chemical and cellular aspects of biology. The program is particularly well suited to students who wish to pursue graduate work in the areas of genetics, biochemistry, microbiology, cellular physiology and anatomy, developmental biology, and molecular biology. The following courses are required: MATH 124, 125, and either MATH 126, 281, or Q SCI 281; CHEM 140, 150; 231, 235, 236 or 335H, 336H, 337H and one chemistry laboratory; PHYS 114, 115, 116 or 121, 122, 123; BIOL 210, 211, 212; BIOC 440, 441, 442; GENET 451; and 15 credits in advanced biology chosen from a broad list of electives. CHEM 350, 351 or 455, 456, 457 are recommended.

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

# BLACK STUDIES

C122 Padelford

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

#### **Affiliated Faculty**

Trevor L'. Chandler, Director; Banks, Barth, Black, Bodden, Bravmann, Brazil, Canon, Chandler, Eastman, Flint, Jones, Holifield, McElroy, Mobley, Spain, Sue, Wagner.

Courses with content of interest to the student of Afro-American culture and history include ANTH 111, 212, 213, 401, 402, 456, 457, 458, 466, 467, 468; ART H 230, 331, 432, 436, 437, 438, 439; CMU 328, 329; C LIT 261, 262, 263, 450; DRAMA 201, 202, 203; EDC&I 269, 469; ENGL 211, 212, 251, 355, 358, 399, 444; GEOG 227; HST 351, 352, 361, 362, 450, 451, 495; HSTAA 443, 444; HUM 103; MUSIC 319, 331, 427; PHIL 113; PHY A 281, 282; POL S 210, 211, 439; PSYCH 250, 260, 443; SOC S 150; SOC 105, 362, 459, 463; SPAN 311, 312.

# **Undergraduate Programs**

#### **Bachelor of Arts Degree**

Major Requirements: 65 credits distributed as follows: 20 credits in core courses at the 100 and 200 levels; 15 credits in courses at the 300 and 400 levels; 30 credits in a single department relevant to Black studies curriculum. Academic units relevant to Black studies include Anthropology, Art, Communications, Comparative Literature, English, Geography, History, Philosophy, Political Science, Psychology, Romance Languages and Literature, Sociology, and Speech.

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

# BOTANY

240 Johnson

The Department of Botany is concerned with the structure, physiology, evolution, and classification of plants with emphasis on both organismal and cellular biology. Special opportunities in botany of the Pacific Northwest are shared with related departments in courses and programs.

#### Faculty

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

ARTS AND SCIENCES



## **Undergraduate Program**

#### Bachelor of Science Degree

Major Requirements: BIOL 210, 211, 212 (or BIOL 101–102 and GENET 451); BOT 113, 320, and 15 credits in upper-division botany, including BOT 371 or 472, and one course in lower plants, one course in higher plants; two upper-division courses in related sciences. Minimum of 10 credits in chemistry (CHEM 140, 150, 151 or 101, 102). In addition, CHEM 231, 232 are recommended.

#### **Graduate Programs**

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

#### Master of Sciénce Degree

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

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

#### **Doctor of Philosophy Degree**

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

Graduation Requirements: Departmental examinations or courses in two areas other than research area. Committees may require additional foreign-language reading in specialty. Most programs include study in related science departments.

# CHEMISTRY

200 Bagley

Chemistry is a branch of natural science that deals principally with the properties of substances, the changes they undergo, and the natural laws that describe these changes.

#### Faculty

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

#### **Undergraduate Programs**

#### Bachelor of Science Degree

Admission Requirements: Suggested high school curric<sup>-7</sup> ulum 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), (students with inadequate backgrounds in laboratory work or descriptive chemistry should include CHEM 151 or 160, or both, in their freshman program; CHEM 147H and 157H may replace 151 and 221); CHEM 221; 335H, 336H, 337H, 346H, 347H (or 231, 235, 236, 241, 242 and a passing score on the standard American Chemical Society examination in organic chemistry); CHEM 455, 456, 457; 10 credits from CHEM 460, 461, 462, 463; 414 (or 416); 5 credits in English composition; one year of physics, including one credit of laboratory (PHYS 121, 122, 123, 132 recommended); MATH 124, 125, 126, and two additional courses numbered 200 or above (MATH 238 and 327 recommended); one year of German, French, or Russian or placement into second year on the language examination; 21 credits of upperdivision science electives. Grade-point average of 2.80 in major courses, with C or better in each course, and a total grade-point average of 2.80 or better.

#### Bachelor of Arts Degree

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

Major Requirements: Chemistry requirements through 221 are the same as those listed for the Bachelor of Science degree, except that CHEM 160 or 414 or 416 is required; CHEM 231, 235, 236, 241, 242 (or 335H, 336H, 337H, 346H, 347H); 350, 351, 455 (or 455, 456, 457); 6 credits from 460, 461, 462, 463; 5 credits in English composition; one year of physics, including one credit of laboratory; MATH 124, 125, 126. A grade of C or better must be obtained in each of the required chemistry courses.

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

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

### Graduate Programs

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

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#### Master of Science Degree

<sup>6</sup>Admission Requirements: Bachelor's degree with major in chemistry. Placement (qualifying) examinations.

Graduation Requirements: With Thesis—36 approved credits with 18 in courses at the 500 level or above; 18 in courses at the 400 level or above (or at the 300 level in outside departments) taken for letter grade; 9 credits in thesis research. Without Thesis—Same as with thesis, except that additional graded course work may be substituted for a part of the required research. Demonstration of proficiency in German or an alternate approved foreign language required for both thesis and nonthesis programs.

#### Doctor of Philosophy Degree

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

Graduation Requirements: 27 credits of approved courses at the 400 level or above and below 600, with Aor 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.

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CHICANO STUDIES

**B503** Padelford

El Centro de Estudios Chicanos was developed to create academic atmosphere on campus that is familiar to the Chicano student and to provide academic support and instructional resources to the community in order to facilitate problem solving and program implementation in the barrio. El Centro de Estudios Chicanos assists in the recruitment and hiring of Chicano faculty, develops courses, and supports community programs relevant to Chicanos. Students interested in a bachelor's degree program centering on Chicano studies should consult a General Studies adviser in B10 Padelford.

# CLASSICS

218 Denny

Classics encompasses the study of ancient Greek and Roman civilizations in all their aspects, from prehistoric times to the Middle Ages, including the Greek and Latin languages, the many kinds of literature written in them (such as poetry, drama, history, philosophy, rhetoric, political theory), and ancient art and archaeology.

#### Faculty

Colin N. Edmonson, Chairman; Bliquez, Densmore (emeritus), Edmonson, Grummel, Harmon, MacKay, McDiarmid, Pascal, Read (emeritus), Roth, Vignoli. W. C. Grummel, graduate program adviser.

# **Undergraduate Programs**

## **Bachelor of Arts Degree**

MAJOR REQUIREMENTS

*Classical Studies:* Greek or Latin through 203 and 208; 36 credits chosen with department approval from courses in upper-division Greek, upper-division Latin, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science. CLAS 101 and HST 111 are not acceptable.

*Classics:* 18 approved credits in upper-division Greek courses; 18 approved credits in upper-division Latin courses.

*Greek:* 27 approved credits in upper-division Greek courses and 9 credits chosen with department approval from courses in Latin, upper-division Greek, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science.

Latin: 27 approved credits in upper-division Latin courses and 9 credits chosen with department approval from courses in Greek, upper-division Latin, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science.

Honors Programs: Bachelor's degree "With College Honors" or "With Distinction" in Latin, in Greek, or in classics. The honors adviser must be consulted about requirements.



*Teaching Programs:* Teaching major or minor in Latin and in classical studies. Information on requirements appears in the "College of Education" section of this catalog.

#### **Graduate Programs**

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

#### Master of Arts Degree

Admission Requirement: Two years of upper-division study in either Greek or Latin.

Graduation Requirements: 27 credits in courses or seminars in Greek or Latin, or both, and in related subjects approved by the department; a reading knowledge of French or German; either a thesis or 9 additional credits in approved graduate courses and seminars and a research paper.

#### **Doctor of Philosophy Degree**

Admission Requirements: Two years of upper-division study in both Greek and Latin, but less preparation in one language may be accepted if preparation in the other language is exceptionally strong. Admission to the doctoral degree program may be granted after satisfactory completion of 27 credits of graduate study, the reading knowledge examination in French or German, and examinations in the translation of Greek and Latin at sight, to be taken not later than the second quarter after the completion of 27 credits of graduate work.

Graduation Requirements: 72 credits in courses or seminars in Greek, Latin, and related subjects approved by the department; a reading knowledge of French and German; examinations or approved courses in Greek and Latin composition; translation examinations on the reading list of both Greek and Latin authors; three research papers; an oral General Examination; dissertation and Final Examination. Graduate students must have teaching experience before completing requirements for their terminal degrees.

# COMMUNICATIONS

127 Communications

The School of Communications offers undergraduate professional preparation in editorial journalism, advertising, radio and television broadcasting, broadcast journalism, and communication. Undergraduate majors are given training in communication skills and opportunities for practicum in their fields. The undergraduate program is interdisciplinary, with emphasis on the social sciences and humanities.

#### Faculty

Alex S. Edelstein, Director; Ames, Bowen, Broughton, Carter, Cranston, Dervin, Edelstein, Fitchen, Godfrey, Holifield, Johnston, Parker, Pember, Ris, Roller, Samuelson, Shadel, Stamm, Wike, Yerxa. W. E. Ames, graduate program adviser.

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#### Undergraduate Programs Bachelor of Arts Degree

Admission Dequirements

Admission Requirements: 90 credits completed with no more than 20 credits in School of Communications courses; CMU 150 and 200 completed (or equivalents) with grades acceptable to school faculty; a University of Washington grade-point average at least equal to the all-University cumulative average last reported (or, if transferring from another institution, a grade-point average of at least 3.00); letters and test scores as required by faculty. Satisfaction of these minimum requirements assures consideration; it does not guarantee acceptance.

Major Requirements: 10 credits from courses in literature; 35 credits in related social science courses as specified by school faculty, to include at least 20 credits in upper-division courses and 20 credits in one department; core requirements of at least 50 credits within the school to include CMU 150, 200, 320, and two additional communications courses at the 400 level, with the exclusion of CMU 449, 495, 496, 497, and 498; and one of the following sequences of study: Editorial Journalism-CMU 321, 322, and 4 to 12 credits from among CMU 323, 324, or 325. Broadcast Journalism-CMU 321, 353, 354, 355, 356, and 357. Advertising-CMU 340, 341, 345, 346, 348, and MKTG 300. Radio-Television-CMU 349, 360, and at least 6 additional credits in radio-television courses. Communication-CMU 400, 406, 411, 414, 480 or 481, 348 or 402 or 470; and HSTAA 454, POLS 452, PSYCH 345, and SOC 443.

Honors Program: Bachelor's degree "With College Honors in Communications" or "With Distinction in Communications." The honors adviser must be consulted about requirements.

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

#### **Graduate Programs**

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

#### Master of Communications Degree

Admission Requirements: Above-average undergraduate record, Graduate Record Examination, and letter of intent. Graduation Requirements: Option A-15 credits (at least two courses at the 500 level) from each of two communication fields and 9 credits from research work. Option B-25-27 credits in a single area outside communications; 18-20 credits of general communications studies, seminar, and practicum.

#### Master of Arts Degree

Admission Requirements: Same as for the Master of Communications degree, plus the Miller Analogies Test.

Graduation Requirements: Same as Option A, except that a thesis, rather than a research paper, is required. Information on the language requirements can be obtained from the student's adviser.

#### **Doctor of Philosophy Degree**

Admission Requirements: For new students, the same as for the Master of Arts degree; continuing students must reapply for admission to the program.

Graduation Requirements: Usually two academic years of study beyond acquisition of the Master of Arts degree; preliminary written and oral examination; dissertation; teaching experience. Information on the language requirement can be obtained from the student's adviser.

# COMPARATIVE AND FOREIGN AREA STUDIES

406 Thomson

The Institute for Comparative and Foreign Area Studies coordinates undergraduate and graduate instructional and research programs on East Asia, Russia and Eastern Europe, South Asia, Africa, Latin America, and the Near East. The institute also sponsors a program in religious studies and topical seminars and courses in other fields that are especially suited to comparative international study.

#### Faculty

Herbert Ellison, Director. East Asian Studies Group: China and Inner Asia—James R. Townsend, Associate Director; Brandauer, Chan, Chang, Cirtautas, Dull, Hsiao (emeritus), Hsu, Kapp, Knechtges, Mah, Norman, Poppe (emeritus), Serruys, Taylor, Treadgold, Wang, Wilhelm (emeritus), Williston (emeritus), Wylie, Yen. East Asian Studies Group: Japan and Korea— Kenneth B. Pyle, Associate Director; Beckmann, Butow, Hanley, Hellmann, Henderson, Hiraga, Kakiuchi, Lukoff, McKinnon, Miller, Niwa, Palais, Suh, Takaya, Tatsumi (emeritus), Webb, Yamamura. Russian and East European Studies Group-Peter F. Sugar, Associate Director; Augerot, Boba, Coats, Ellison, Gershevsky (emeritus), Gribanovsky, Hagglund, Haney, Jackson, Kapetanic, Konick, Kramer, Legters, Micklesen, Paul, Reshetar, Romanowski, Scherr, Spector (emeritus), Swayze, Szeftel (emeritus), Thornton, Treadgold, Trnka, Velikonja, Waugh, West. South Asian Studies Group-Karl H. Potter, Associate Director; Brass, Conlon, Curtis, Hiebert, Kakiuchi, Morris, Rogers, Ruegg, Schiffman, Shapiro, Thrasher. African Studies Group-Rene Bravmann, Chairman; Crutchfield, Eastman, Griffeth, Hechter, Hill, Kauffman, Knight, Leiner, Marong, Morell, Osborne, Ottenberg, Spain, Van Den Berghe, Winans. Near Eastern Studies Group-Farhat J. Ziadeh, Chairman; Andrews, Bacharach, Brame, Clear, Heer, Loraine, MacKay, Podet, Sugar. Latin American Studies Group-Dauril Alden, Chairman; Algeo, Bodden, Garfias, Greengo, Hunn, Krieger, Myhr, Solberg, Ullman, Vargas-Baron, Ybarra-Frausto.

#### **Undergraduate Programs**

#### **Bachelor of Arts Degree**

Regional studies core programs, combining language instruction with history and interdisciplinary area training, are offered for the following areas: China, Japan, Korea, Russia, East Europe, and South Asia. An Inner Asian studies program also is offered.

Major Requirements: All programs require language training through the second year (30 credits or equivalent); additional language training is recommended. Additional requirements for individual programs are as follows:

China Regional Studies: HSTAS 211, 212, 213; 25 credits in 300- and 400-level courses on East Asia, of which 15 must deal with China; EASIA 455.

Japan Regional Studies: HSTAS 211, 212, 213; 25 credits in 300- and 400-level courses on East Asia, of which 15 must deal with Japan; EASIA 451.

Korean Regional Studies: HSTAS 211, 212, 213, 469, 470; 25 credits in 300- and 400-level courses on East Asia.

Russian Regional Studies: REEU 243, 457; 15 credits in a selected discipline; 20 credits in 300- and 400-level courses on Russia.

*East European Regional Studies:* REEU 220 (or its equivalent), 458; 15 credits in a selected discipline; 20 credits in 300- and 400-level courses on East Europe.

South Asia Regional Studies: HSTAS 201, 202; 30 credits in one discipline (anthropology, economics, history, political science, or linguistics); 15 credits, oriented to South Asia, in social sciences disciplines other than that of concentration; SASIA 498.

Inner Asian Studies: Language requirement (30 credits) plus a minimum of 15 credits in a selected discipline. No formal degree program is currently offered, but a student may plan an atypical major centering on Inner Asian studies leading to the baccalaureate degree in the field of general studies.

African Studies: No formal degree program is currently offered, but a student may plan an atypical major centering on African studies leading to the bachelor's degree in the field of general studies.

Latin American Studies: Requirements are two years of Spanish and one year of Portuguese or two years of Portuguese and one year of Spanish; 48–50 credits, including ANTH 322 or 418 plus one elective; G ST 492, 493; HSTAA 381, 382, 383 (two of three); POL S 323, 342; 9 credits in Spanish American or Luso-Brazilian literature; one elective and senior thesis. No formal degree program is currently offered, but students may plan a major centering on Latin American studies leading to the baccalaureate degree in the field of general studies.

Religious Studies: No formal degree program is currently offered, but a student may plan an atypical major in comparative religion leading to the bachelor's degree in the field of general studies. Courses providing opportunity for historical and comparative study of religious thought and expression include ANTH 404, 412, 436; ART H 417, 418, 421, 521; CLAS 430, 445; HST 261, 307, 461, 462, 463, 561, 562, 563; HSTAM 441; HSTAS 201, 421; HSTEU 401, 402; EASIA 240, 443; IASIA 431, 464; SASIA 291, 472, 473; N E 210, 220, 420, 422, 430, 432, 434, 450, 451; PHIL 267, 286, 321, 412, 415, 416, 467, 469, 586; POL S 430, 538; SCAND 230; SOC 457; scriptural languages, such as Akkadian, Arabic, Aramaic, Chinese, Greek, Hebrew, Hindi, Japanese, Persian, Sanskrit, Tamil, Tibetan, and Urdu.

Honors Program: Bachelor's degree "With College Honors in (area)" or "With Distinction in (area)." The honors adviser may be consulted about requirements.

*Teaching Program:* Teaching major and minor in comparative and foreign area studies. Information on requirements appears in the "College of Education" section of this catalog.

#### **Graduate Program**

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

Master of Arts Degree

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

# COMPARATIVE LITERATURE

B434 Padelford

Comparative literature offers the study of literature in its essential nature, unrestricted by national or linguistic differences. The undergraduate program provides a survey of classics that have formed literary taste over the centuries. It includes courses examining literary works under the generic aspects of narrative, drama, and lyric, as well as a variety of courses dealing with diverse aspects of literature viewed internationally. In the graduate program, the comparative task proceeds by means of concentration on two or more national literatures, studied in their original languages.

#### Faculty

Frank J. Warnke, Chairman; D. Behler, E. Behler, Christofides, Ellrich, Grummel, Hildeman, Hruby, F. Jones, L. Jones, Konick, Kramer, J. Leiner, W. Leiner, Loraine, MacKay, McKinnon, McLean, Reinert, Sehmsdorf, Thompson, 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; C LIT 300, 301, 302, and two additional courses in comparative literature; and at least one course in a literature other than English, studied in the original tongue. Remaining credits are to be earned, with few exceptions, in 300- and 400-level courses from among the offerings from Comparative Literature and the eight participating departments: Asian Languages and Literature, Classics, English, Germanic Languages and Literature, Romance Languages and Literature, Scandinavian Languages and Literature, and Slavic Languages and Literature. Departmental courses in foreign literature in translation are listed under the respective departments.

Teaching Program: Teaching major or minor in comparative literature. Information on requirements ap-
pears in the "College of Education" section of this catalog.

#### **Graduate Programs**

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

#### 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.

## DRAMA

#### 113 Drama-TV

The School of Drama is concerned with the whole continuum of acting, directing, designing, theatre history, dance, and dramatic forms through which the human, dramatic imagination finds expression, from the spontaneous, imaginative play of children to the theatre arts of criticism.

#### Faculty

James R. Crider, Acting Executive Director; Boris, Carr, Conway, Corzatte, Crider, Dahlstrom, Davis (emeritus), Falls, Forrester, Galstaun, Gray', Green, Haaga, Harrington (emeritus), Loper, Lorenzen, Lounsbury, Mobley, Roberts, Rolfe, Ross, Siks, Sydow, Valentinetti, West, White, Wolcott. J. R. Crider, graduate program adviser.

#### **Undergraduate Programs**

#### Bachelor of Arts Degree

Admission Requirements: Complete a minimum of two drama-dance-prefix courses at the 100–200 level (DRAMA 298 or 498, DRDNC 470 not acceptable); earn a minimum of six production participation points; complete, or be in the process of final completion of, 45 credits of college-level work (three quarters). Production participation points may be earned as follows: auditions for directing class project or theatre production, one point; acting as a super, one point; acting, speaking role (twenty to forty hours rehearsal/performance), two points; acting, speaking role (forty to sixty hours rehearsal/performance), three points; technical crew: first experience, one point—second experience, two points—third experier e, / three points. With the exception of audition, academic credit may be granted upon student request under DRAMA 298 or 498 or DRDNC 470 for production participation. For the transfer student, drama course work taken at any accredited two- or four-year institution and evidence of production participation are accepted to meet these premajor requirements. However, credit under DRAMA 298 or 498 or DRDNC 470 may not be granted for production work performed at another institution. Each eligible applicant for major is screened by the chairman in whose emphasis area the student wishes to study. The screening uses the following instruments: Acting |Directing: acting audition plus written analysis of play as if preparing a production (for directors). Admission to major with an acting emphasis is made early in Spring Quarter or immediately before Autumn Quarter after the auditions for placement in DRAMA 251 are held. Children's Drama: interview plus résumé and written statement of professional/educational objectives. Dance: audition plus interview. Design/Technical: interview plus examples of graphic work. Theatre History/Drama: interview plus acting audition and sample of written work.

*Major Requirements:* Completion of all premajor requirements; completion of balance of a minimum of 60 credits in drama-prefix courses, of which 20 must be earned at the 300–400 level.

Dance emphasis students must complete 20 credits in drama-prefix courses and 40 in drama-dance-prefix courses, including 30 in Dance Techniques courses, 3 in Structure of Music in Relation to Dance courses, and 1 in Introduction to Dance History.

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

#### Bachelor of Fine Arts Degree

Admission Requirements: Complete, or be in the 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 15 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.

## ARTS AND SCIENCES



#### **Graduate Programs**

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

#### Master of Arts Degree

Admission Requirements: Directing—Directorial analysis, not to exceed ten pages of double-spaced typing, of a play as if preparing a production, and two letters of recommendation. Design (Costume and Scenery) or Technical Direction—Portfolio of designs, technical plots, or working drawings, plus two letters of recommendation and a brief statement of purpose in acquiring a graduate degree. Children's Drama—Two letters of recommendation and a statement of purpose; if the applicant wishes to study children's theatre directing, a directorial analysis should be submitted.

Graduation Requirements-Directing: DRAMA 463, 561 (three quarters), 562, 563 (six quarters), 700 (9 credits). Design (Costume and Scenery)-DRAMA 419, 517, 518, 519; three quarters 'each of 510, 511; two quarters of 599 (5 credits each); 700 (9 credits); 413, 417, 410, 411, 412, 491, 496 can be varied to shape the program toward more specific emphasis in costume or scenery. Technical Direction-DRAMA 413, 419, 517, 518, 519; three quarters each of 410 or 412; 510, 513; two quarters of 599 (5 credits each) and 600 (6 credits). Children's Drama-DRAMA 460, 461, 462, 530, 551-552-553, 700 (9 credits) and combinations of 431, 432, 436, 437, 438, 463, 492, 561, 562. Theatre History-Covered under Drama Arts in the "Interdisciplinary Graduate Degree Programs" section of this catalog. There is no foreign-language requirement.

## Doctor of Philosophy Degree

Covered under Drama Arts in the "Interdisciplinary Graduate Degree Programs" section of this catalog.

## ECONOMICS

301 Savery

The Department of Economics is concerned with the analysis of the ways societies organize the production of goods and services and the distribution of these among groups and individuals. Applied fields include urban economics, money and banking, industrial organization, natural resource economics, labor economics, public finance, economic history, comparative systems and development, international trade and econometrics.

#### Faculty

Douglass C. North, Chairman; Barzel, Bassett, Brown, Cheung, Cox, Crutchfield, Dowdle, Gillingham, Hadjimichalakis, Halvorsen, Hartman, Hashimoto, Higgs, Hopkins (emeritus), Huber, Kessel, Kochin, Mah, McCaffree, McGee, Miller, Morris, Mund, North, Ozenne, Parks, Pollakowski, Rahm, 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: Bachelor's degree "With College Honors in Economics" or "With Distinction in Economics." The honors adviser must be consulted about requirements.

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

### Graduate Programs

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

#### Master of Arts Degree

Admission Requirements: Undergraduate major in economics is not required. Admission applicants are judged on performance in courses in which analytical skills are required and on Graduate Record Examination aptitude scores. Students with little training in economics may be required to do preliminary work in undergraduate courses.

Graduation Requirements: ECON 411, 500, 501, 502, 503 plus two additional courses at the 500 level and five additional courses at the 400 level or above. A thesis may be substituted for any three courses. There is no foreign-language requirement.

#### **Doctor of Philosophy Degree**

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

Graduation Requirements: Theory (ECON 500, 501, 502, 503); mathematics (ECON 410, 411, 412); statis-

tics and econometrics (ECON 481, 482). Eight additional courses are required (four at the 500 level, four at the 400 level or above) as well as three courses in the student's major field. Core examinations in microeconomics and macroeconomics and a major field examination. General Examinations, dissertation, and Final Examination. There is no foreign-language requirement.

Fields of specialization include: comparative economic development; economic history; mathematical economics; government regulation, industrial organization; natural resources; international trade; labor economics; public finance; and statistics and econometrics.

Formal interdisciplinary study and research can be arranged through the cooperation of the Institute for Comparative and Foreign Area Studies, the Institute for Environmental Studies, and other University areas.

## ENGLISH

A101 Padelford

The Department of English offers instruction in elementary composition, advanced composition of various kinds, English literature, American literature, and, in the comparative literature courses, some of the literature of other countries.

#### Faculty

Robert D. Stevick, Chairman; Abrams, Adams, Alexander, Allen, Anderson (emeritus), Baldwin, Banta, Bentley, Blake, Blessing, Bowie, Brenner, Brown, H. Burns (emeritus), W. Burns, Butwin, Clemens, Coldewey, Cox, Culbert, Duckett (emeritus), Dunlop, Dunn, Eby (emeritus), Emery (emeritus), Ethel (emeritus), Fisher, Fowler, Frank, Frey, Gerstenberger, Gould (emeritus), J. Griffith, M. Griffith, Guberlet (emeritus), Harris, Hatfield, Heilman, Hilen, Hudson, Irmscher, Jones, Kaplan, Kartiganer, Kaufman (emeritus), Kolpacoff, Korg, LaGuardia, Lockwood, Longyear, Magie, Matchett, McCracken, McGuire, Mobley, Modiano, Nix (emeritus), Oberg, Palomo, Pellegrini (emeritus), Person (emeritus), Phillips, Reinert, Requa, Rivenburgh (emeritus). Sale, Shulman, Siegmund, Simonson, Smith, Stanton, Stevick, Stirling (emeritus), Streitberger, Vaughan, Wagoner, Walters (emeritus), Warnke, Webb, Webber, Webster, Willeford, Willis (emeritus), Winther (emeritus), Yaggy, Zillman (emeritus). T. Lockwood, gradчñ uate program adviser.

#### Undergraduate Programs Bachelor of Arts Degree MAJOR REOUIREMENTS

Language and Literature: 50 credits, which must include 5 credits within the period Beowulf to 1600, through Shakespeare, 5 credits in English literature within the period 1600–1780, 5 credits in English literature within the period 1780 to the present, and 5 credits in American literature. Recommended are ENGL 391, 393, one advanced writing course.

Composition and Advanced Writing: 50 credits, which must include the courses required for the curriculum in language and literature and, in addition, 20 credits in advanced writing courses (15 credits in upper-division courses in at least two forms [e.g., short story, novel, drama, poetry, expository writing]).

Honors Program: Bachelor's degree "With College Honors in English" or "With Distinction in English." The honors adviser must be consulted about requirements.

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

#### **Graduate Programs**

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

#### **Master of Arts Degree**

Admission Requirements: Bachelor of Arts degree with major in English equivalent to that at the University of Washington. Reading knowledge of an approved foreign language. Graduate Record Examination aptitude and advanced literature in English tests. Two letters of recommendation.

Graduation Requirements: Literature—35 credits, of which 25 must be in courses numbered 500 or above. Of these, 10 credits may be in courses in other departments. A maximum of 5 quarter transfer graduate credits may be accepted if taken while a graduate student in another recognized graduate school. Written examination on four fields chosen in consultation with the chairman of graduate programs. Advanced Creative Writing—35 credits, of which not more than 15 may be in advanced writing courses. Written examination in one genre on a list of titles proposed by the student and approved by the Graduate Studies Committee. A piece of original imaginative writing (thesis, 10 credits).

#### Master of Arts for Teachers Degree

Admission Requirements: Same as for the Master of Arts degree, plus prior teaching experience.



Graduation Requirements: 39 or 40 credits, of which 24 or 25 must be in courses numbered 500 or above. ENGL 535, 553, and 580. A concentration of three related courses (e.g., in criticism, literature, language, rhetoric, advanced writing, or courses outside the department, subject to approval and not to exceed 15 credits). A maximum of 5 quarter credits may be transferred from an accredited institution.

#### **Doctor of Philosophy Degree**

Admission Requirements: Petition to Graduate Studies Committee after completion of 30 credits of graduate course work and acquisition of the Master of Arts degree or passing of qualifying examination. Reading knowledge of two foreign languages, usually Latin or French, and German.

Graduation Requirements: 60 credits, of which 50 must be in courses at the 500 or 600 level. As many as 15 credits may be in approved courses in other departments. ENGL 505, 530, and 531. Preliminary examination consisting of written examinations in three of the six historical surveys in two other fields, and a General Examination (oral) in the field of the student's specialization. A student electing a major, or minor, in English language may substitute this field for one of the literary periods. Dissertation. Oral Final Examination.

## ENVIRONMENTAL STUDIES

112 Sieg

The Institute for Environmental Studies was established in September, 1972, for the purposes of developing interdisciplinary environmental programs at both the undergraduate and graduate levels, facilitating the design and implementation of interdisciplinary research projects, and serving the public. The institute is administered by an Environmental Studies Board, comprising eleven deans representing a broad spectrum of environmental concerns.

Robert O. Sylvester, Director

#### **Undergraduate Programs**

Although the institute does not yet have a degree program of its own, students at the undergraduate level may design a program in environmental studies through General Studies, utilizing institute courses and courses from other departments. Advising services are provided by the institute.

## **GENERAL STUDIES**

## C14 Padelford

General Studies provides access to an individual degree program through the atypical major and to organized interdisciplinary degree programs.

#### **Undergraduate Programs**

#### **Bachelor of Arts and Bachelor of Science Degrees**

Admission Requirements: Ordinarily, a 2.50 gradepoint average, an interdisciplinary program planned with several faculty members and a General Studies adviser, and agreed-upon faculty sponsorship for the senior thesis.

Major Requirements: Ordinarily, from 50 to 70 credits in courses related to major, and no fewer than three quarters in the program. Completion of required senior thesis. Precise curriculum to be determined in consultation with General Studies adviser and an appointed faculty advisory committee. Examples of interdisciplinary programs appear in the "Office for Undergraduate Studies" section of this catalog. The awarding of Bachelor of Arts or Bachelor of Science degrees is based on each student's degree program.

Honors Program: Bachelor's degree "With College Honors in General Studies." The honors adviser must be consulted about requirements.

## GENETICS

J205 Health Sciences

Genetics undertakes to study the nature and function of the genetic material and its transmission from generation to generation, the application of genetic principles to problems of cellular and organismal development, and the study of human genetics and its relation to medicine.

#### Faculty

Herschel L. Roman, Chairman; Byers, Bendich, 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.

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#### Graduate Programs

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

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#### 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.

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#### 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.

14

### GEOGRAPHY

406 Smith

The Department of Geography is concerned with the study of the location, spatial organization, and spatial interaction of both natural and human phenomena: ways environmental, economic, social, political, and other phenomena are structured spatially or regionally.

#### Faculty

Richard Morrill, Chairman; Beyers, Boyce, Chang, Eichenbaum, Fleming, Jackson, Kakiuchi, Krumme, Marts, Morrill, Romanowski, Sherman, Thomas, Ullman, Velikonja, Youngmann. J. Velikonja, graduate program adviser.

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Undergraduate Programs Bachelor of Arts Degree

*Major Requirements:* Ordinarily, GEOG 100; three of GEOG 200, 205, 207, 258, 277; two of GEOG 300, 350, 360, 370; one additional course at the 300 level; at least three courses at the 400 level (two systematic

and one regional). Maintenance of a 2.50 grade-point average within geography. Options include the following: General Geography-60 credits in geography, including a broad range of systematic, regional, and technical courses. Urban and Regional Analysis-45 credits in geography and 30 in closely related fields. Possible concentrations in regional development; urban analysis; transportation; location theory; regional 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**

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

#### **Master of Arts Degree**

Graduation Requirements: 36 credits and a thesis to be completed within six quarters. The student may pursue a broad Master of Arts degree program or more professional and interdisciplinary specializations as follows: Urban and Regional Analysis—including regional planning and development, urban structure, transportation, location theory, regional political structure, and regional social structure. Cartography/Spatial Analysis. Environmental Studies—environmental perception, resource management and conservation (in cooperation with the Institute for Environmental Studies). Eurasian Studies —USSR, China, Japan, Europe (in cooperation with the Institute for Comparative and Foreign Area Studies).

#### **Doctor of Philosophy Degree**

Graduation Requirements: At least two years of post-Master of Arts degree credit, after assurance of general competence in geography; departmental written diagnostic examination; General Examination; dissertation and Final Examination; reading knowledge of one foreign language. Programs are as outlined under Master of Arts degree. Interdisciplinary studies are encouraged or required as appropriate to these specializations (e.g., a working knowledge of a language for Eurasian studies; economic theory for regional analysis; data processing for spatial analysis).

## GEOLOGICAL SCIENCES

57 Johnson

Within the purview of geological sciences fall the collection and interpretation of careful and perceptive field observations as well as the integrated application of principles of physics, chemistry, biology, and mathematics to the study of the earth, its environment, its origin, and the processes by which it has been transformed and reconstituted through geologic time.

#### Faculty

John T. Whetten, Chairman; Barksdale (emeritus), Bostrom, Cheney, Christensen, Coombs, Dunne, Evans, Ghose, Goodspeed (emeritus), Gresens, Hanson, Mallory, McCallum, Misch, Porter, Rensberger, Stewart, Stuiver, Vance, Washburn, Wheeler, Whetten, Whitney. J. M. Rensberger, graduate program adviser.

#### **Undergraduate Program**

#### **Bachelor of Science Degree**

Admission Requirements: Suggested high school curriculum to include at least three units of mathematics, one unit of physics, and one unit of chemistry.

Major Requirements: GEOL 205, 301, 320, 321, 340, 361, plus 20 credits at the 400 level; MATH 124, 125, 126; CHEM 145 or 140, 155 or 150, 160; PHYS 121 or 114, 122 or 115, 123 or 116. Recommended: MATH 238, 327, 328, and PHYS 221, 222, 223, or BIOL 101–102.

### **Graduate Programs**

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

#### Master of Science Degree

Graduation Requirements: With Thesis—36 credits, of which 18 must be in courses at the 500 level or above and up to 9 may be for thesis (GEOL 700). Without Thesis—45 credits, of which 18 must be in courses at the 500 level or above, which includes a 5-credit research paper (GEOL 600). A maximum of 9 credits of field geology may be applied. All students must present approved field course or other approved field experience. Oral examination by Master of Science Supervisory Committee; final examination consists of oral presentation and defense of thesis.

#### **Doctor of Philosophy Degree**

Admission Requirements: Either Master of Science or Master of Arts degree in geological sciences or related field.

Graduation Requirements: Credits variable; one-half

#### ARTS AND SCIENCES



total program, including dissertation, must be in courses at the 500 level or above; a minimum of 27 credits for thesis (GEOL 800); at least 18 credits completed with letter grade in courses numbered 300, 400, and 500. Passage of preliminary examination before Doctor of Philosophy Supervisory Committee or *ad hoc* Supervisory Committee and completion of two years of graduate study, passage of General Examination, and admission to candidacy; completion of acceptable dissertation and passage of Final Examination.

## GEOPHYSICS

202 Atmospheric Sciences–Geophysics

Geophysics is an interdisciplinary physical science concerned with the nature of the earth and its environment. It seeks to apply the techniques of physics, mathematics, and chemistry to the study of complex phenomena and the enormous energy resources of the geophysical system.

#### Faculty

Stewart W. Smith, Chairman; Blacic, Booker, Bostrom, Businger, Charlson, Christensen, Clark, Criminale, Crosson, Fairhall, Helms, Hodge, LaChapelle, Leovy, Lewis, Lister, Merrill, Parks, Raymond, J. D. Smith, S. W. Smith, Swarm, Untersteiner. C. F. Raymond, graduate program adviser.

#### **Undergraduate Programs**

An undergraduate degree is not offered.

#### **Graduate Programs**

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

#### Master of Science Degree

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

Admission Requirements: Undergraduate degree in a physical science and a strong background in physics and mathematics. Graduate Record Examination or equivalent. Written qualifying examination.

Graduation Requirements: With Thesis—36 credits, of which 9 must be in geophysics courses at the 500 level. Course of study and thesis project must have approval of advisory committee.

Doctor of Philosophy Degree

Area of Specialization: Same as for the Master of Science degree.

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

Graduation Requirements: Three academic years of study. Dissertation. Information on the language requirement can be obtained from the student's adviser.

# GERMANIC LANGUAGES

340 Denny

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

#### Faculty

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

#### Undergraduate Programs Bachelor of Arts Degree

Major Requirements: 34 credits in core courses: GERM 301, 302, 303; 401, 402; 310, 311, 312; 413, 414; 18 credits of electives in upper-division German courses. At least a C must be earned in every upperdivision German course; a 2.50 grade-point average must be maintained in these courses.

Honors Program: Bachelor's degree "With College Honors in German" or "With Distinction in German." The honors adviser must be consulted about requirements.

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

#### Graduate Programs

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

#### **Master of Arts Degree**

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

Graduation Requirements: Two programs: Conventional Master of Arts I, with specialization in either literature or philology leading to Doctor of Philosophy degree; and alternate Master of Arts II, providing a broader background in German literature and civilization and stressing teaching rather than research. Each program requires that 36 credits be completed in one year, two term papers in lieu of thesis, comprehensive written examination, passing reading knowledge examination in German. Master of Arts I program students may minor in another field, in which case 24 credits must be earned within the Department of Germanic Languages and Literature; remaining credits to be determined by minor department. Students may fulfill a Master of Arts II program by taking courses during three consecutive summers rather than through the regular one-year program.

#### Doctor of Philosophy and Doctor of Arts Degrees

Admission Requirements: Master of Arts I program prerequisite for Doctor of Philosophy degree; Master of Arts II program prerequisite for Doctor of Arts degree.

Graduation Requirements: 54 post-Master of Arts degree credits, of which 36 must be earned in graduate courses in Germanic languages and literature. Comprehensive written examinations. Passing a reading knowledge examination in a foreign language other than German. Participants in the Doctor of Philosophy degree program have three options: (1) to gain the remaining 18 credits by minoring in another department; (2) to take 36 credits in German literature since the fifteenth century and 18 credits in Germanic literature before the fifteenth century and in Germanic linguistics; (3) to reverse the credit requirements in (2) above; participants in the Doctor of Arts degree program may acquire the remaining 18 credits in the fields of education, history, philosophy, or anthropology and must serve two quarters of internship at another institution of higher learning.

## HISTORY

315 Smith

History undertakes the study of human affairs in a manner that seeks to understand change and develop-

## ARTS AND SCIENCES



ment rather than the state of things at a given moment, taking into account societies in diverse parts of the world from the earliest times for which written records exist to the present.

#### Faculty

Donald W. Treadgold, Chairman; Alden, Bacharach, Bell, Bestor, Boba, Bridgman, Burke, Butow, Carstensen, Conlon, Costigan, Dobie (emeritus), Dull, Ellison, Emerson, Ferrill, Flint, Fowler, Griffiths, Hankins, Holl, Holt (emeritus), Johnson, Kaminsky, Kapp, Katz, Kilcup, Levy, Lytle, Mosher, Palais, Pease, Pinkney, Pressly, Pyle, Saum, Savelle (emeritus), Solberg, Sugar, Szeftel (emeritus), Thomas, Treadgold, Ullman, Waugh. D. H. Pinkney, graduate program adviser.

#### **Undergraduate Programs**

#### Bachelor of Arts Degree

Major Requirements: 50 credits in history, with a grade-point average of at least 2.00. At least 5 credits each of ancient, medieval, modern European, and American history (i.e., HST 111, 112, 113 and HSTAA 201 or upper-division courses in the same subject areas; adviser must approve substitutions for the basic courses). At least 25 upper-division credits. Beyond the 20 credits of required subjects, the student may or may not specialize, depending on personal interests and career plans. In addition to all courses with the prefix HST, the history major may also include approved courses offered outside the Department of History. A short list of these courses is maintained by undergraduate advisers.

Honors Program: Bachelor's degree "With College Honors in History" or "With Distinction in History." The honors adviser must be consulted about requirements.

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

#### Graduate Programs

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

#### Master of Arts Degree

Admission Requirements: Strong undergraduate program in history; grade-point average above 3.00, especially in history and related subjects and particularly in the final two years of work; General Record Examination verbal aptitude score in the eightieth percentile or higher; evidence of ability to write cogently and lucidly and to interpret historical data; recommendations of three persons acquainted with applicant's academic abilities.

*Graduation Requirements:* Reading knowledge of one language in addition to English; satisfactory performance on written examinations in two fields of history; completion of a graduate seminar; thesis or two seminar papers.

#### Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Arts degree, plus completion of at least one year of graduate study in history with distinction.

Graduation Requirements: Reading knowledge of one language in addition to English and such other languages as are necessary for the program the student elects; satisfactory performance in written and oral examinations in four fields of history; completion of a graduate seminar; dissertation and satisfactory defense of the dissertation in an oral Final Examination.

## HOME ECONOMICS

203 Raitt

The field of home economics synthesizes knowledge drawn from its own research, from the physical, biological, and social sciences, and the arts, and applies this knowledge to improve the lives of families and individuals.

#### Faculty

Mary Louise Johnson, Director; Bovy, Brockway, Buergel, Childs, Fontana, Granberg, Hall, Johnson, Katz, Martinsen, McAdams (emeritus), Monsen, Murdoch, Pipes, Rowntree (emeritus), Schroeder, Shigaya, Stone, Stuart, Terrell (emeritus), Wilson, Worthington, Yerina. M. L. Johnson, graduate program adviser.

#### Undergraduate Programs

#### Bachelor of Science Degree

CURRICULUM IN NUTRITIONAL SCIENCE AND EXPERIMENTAL FOODS

Major Requirements: H EC 307, 314, 407, 409, 415, 457; BIOC 405; CHEM 140, 150, 151, 231, 232, 241, 242; MICRO 301, 302; PC BS 472 or EDPSY 490; Q SCI 281; ZOOL 208 or CONJ 317-318.

#### Bachelor of Arts Degree

## CURRICULUM IN TEXTILES, CLOTHING, AND ART

Information about this curriculum can be obtained from the School of Home Economics.

## CURRICULUM IN GENERAL HOME ECONOMICS

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Major Requirements: H EC 125, 134, 148, 307, 314, 347, 348, 354, 356, 405, plus 10 credits in electives; ART 109 or 129; CHEM 101, 102; ECON 200; MICRO 101 or 301 and 302; PSYCH 100, 306, EDUC 301; ZOOL 118.

Honors Program: Bachelor's degree "With College Honors in Home Economics." The honors adviser must be consulted about requirements.

*Teaching Program:* Teaching major and minor in home economics. Information on requirements appears in the "College of Education" section of this catalog.

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#### **Graduate Programs**

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

#### 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/or clothing, or dietetics, with 12 credits of a minor other than natural science in any field relative to home economics. Thesis required.

For Institute for Comparative and Foreign Area Studies, see Comparative and Foreign Area Studies

For Institute for Environmental Studies, see Environmental Studies

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## LATIN AMERICAN STUDIES

108B Smith

Latin American studies is an interdisciplinary program intended to provide students with a broad understanding of the history, politics, and culture of Latin America, from pre-Columbian and peninsular origins to the present. Requirements are one year of Portuguese and two years of Spanish, or two years of Portuguese and one year of Spanish, or two years of Portuguese and one year of Spanish, 48 to 50 credits, including ANTH 322 or 418 plus one elective; HSTAA 381, 382, 383 (two of three); POL S 323 and 342; 9 credits in Spanish-American or Luso-Brazilian literature; G ST 492 and 493; one elective course; and a senior thesis. Students interested in a baccalaureate degree program centering on Latin American studies should consult a General Studies adviser in B10 Padelford.

Dauril Alden, Chairman

## LINGUISTICS

B5A Padelford

Linguistics is the scientific study of language, which is one of the most characteristic forms of human behavior. In contrast with other disciplines concerned with languages, linguistics deals with languages from the point of view of their internal structure as cognitive systems. Courses provide training in the method and theory of language analysis and description, as well as techniques for dealing with language change and genetic relationships.

#### Faculty

Sol Saporta, Chairman; Brame, Contreras, Newmeyer, Pope, Saporta, Selinker. S. Saporta, graduate program adviser.

#### **Undergraduate Programs**

An undergraduate degree is not offered. However, introductory courses in the nature of language and language learning and in linguistic method and theory are offered for those who wish to acquire a basic knowledge of the field. Undergraduates planning to work for an advanced degree in general linguistics are especially encouraged to complete this training prior to graduation. For students wishing to take a full complement of work, the following schedule is recommended: junior year, LING 200 or 400, 201, 451, 452, 453, 461, 462; senior year, LING 333, 404, 445, 454, 455, 463.

#### **Graduate Programs**

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

#### Master of Arts Degree

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

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

### ARTS AND SCIENCES



#### **Doctor of Philosophy Degree**

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

Graduation Requirements: Completion of the Master of Arts degree program or 36 credits in linguistics and related areas; 36 additional credits, including 3 credits in LING 599 and 9 credits in LING 800; supervised teaching in phonology, syntax, historical linguistics; General Examination; dissertation; Final Examination.

## MATHEMATICS

138 Padelford

Mathematics is the basic language of physical science and engineering and a discipline in its own right with important applications in the social and natural sciences and in business administration.

#### Faculty

Robert M. Blumenthal, Chairman; Allendoerfer, Arsove, Avann, Beaumont, Benda, Bendersky, Birnbaum, Blumenthal, Brownell, Bungart, Calkins, Chan, Chapman, Corson, Curjel, Curtis, Dekker, Dubisch, Durfee, Erickson, Folland, Gangolli, Glickfeld, Glicksberg, Goldstein, Grunbaum, Hewitt, Hilton, Hirschfelder, Hobby, Hungerford, Jans, Johnson, Kingston, Klee, Knudson, Kozlowski, G. Lumer, L. Lumer, McFarlan (emeritus), Michael, Monk, Moore, Morel, Morrow, Namioka, Nunke, O'Keefe, Ozols, Pearson, Phelps, Pincus, Pyke, Ragozin, Rockafellar, Sarason, Scholz, Segal, Shorack, Smythe, Stout, Sullivan, Thomas, Warfield, Warner, Westwater, Zuckerman (emeritus). R. Warfield, 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, 224, and 205 or 302.

#### **TEACHER PREPARATION OPTION**

Major Requirements: 50 approved credits in mathematics, including MATH 114, 124, 125, 126, 205, or 302, 327, 391, 392, 411, 412, 444, 445. The College of Education also has programs with major or minor in mathematics. In both options, C or higher grades must be obtained in all mathematics courses presented to satisfy the mathematics requirement and a grade-point average of 2.00 or higher must be obtained in all mathematics courses taken.

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#### **Bachelor of Science Degree**

Admission: Same as for the Bachelor of Arts degree.

#### MATHEMATICS OPTION

Major Requirements: 54 approved credits in mathematics, including MATH 124, 125, 126, 224, 302, 324 or 327, and 9 credits in courses numbered 400 or above in each of two of the following four categories: algebra, analysis, geometry, and statistics.

## MATHEMATICAL STATISTICS OPTION

*Major Requirements:* 54 approved credits in mathematics, including MATH 124, 125, 126, 224, 302, 303, 327, 328, 394, 395, 482, 483, and two of the following three courses: MATH 396, 484, 485.

#### NUMERICAL ANALYSIS OPTION

Major Requirements: 54 approved credits in mathematics, including MATH 114, 124, 125, 126, 224, 238, 302, 303, 324 or 327, 374, 438, 464, 465, 466. In all options, C or higher grades must be obtained in all mathematics courses presented to satisfy the mathematics requirement and a grade-point average of 2.00 or higher must be obtained in all mathematics courses taken.

Honors Program: Bachelor, of Science degree only "With College Honors in Mathematics" or "With Distinction in Mathematics." The honors adviser must be consulted about requirements.

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#### Graduate Programs

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

#### Master of Arts Degree

Admission Requirement: Bachelor of Arts degree with major in mathematics or equivalent background.

Graduation Requirements: With Thesis—36 credits in courses at the 400 level or above, of which 18 must be in courses at the 500 level or above, including 9 credits for thesis. At least 6 credits each in algebra, analysis, and one other field. Demonstration of proficiency in French, German, or Russian. Thesis is largely expository. Without Thesis—9 credits for thesis can be replaced by 9 credits of courses at the 500 level or above in mathematics.

#### Master of Arts for Teachers Degree

Admission Requirement: Bachelor's degree with background in mathematics.

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

#### Master of Science Degree

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

Graduation Requirements: With Thesis—Same as for the Master of Arts degree with thesis, except that the thesis must 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 French, German, or Russian; dissertation; and Final Examination.

## MICROBIOLOGY

G305 Health Sciences

The Department of Microbiology is a basic biological science department concerned with microbiology and immunology. Microbiology is a branch of natural science that deals with microscopic organisms, including bacteria, viruses, fungi, protozoa, and algae. It is concerned with the nature and properties of these organisms and their effects on man and the environment.

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

#### Faculty

John C. Sherris, Chairman; Barnes, Chambers, Champoux, Chilton, Clagett, Clausen, Coyle, Cramer, Douglas, Evans, Falkow, Groman, Hakomori, Hellstrom, Kenny, Kiehn, Klebanoff, Lara, Laxson, Mannik, Memmer, Nester, Ordal, Parkhurst, Pearsall, Pollack, Pollock, Portman, Ray, Schoenknecht, Sherris, Staley, Storb, Weiser, Whiteley.

#### **Undergraduate Programs**

#### **Bachelor of Science Degree**

Admission Requirements: Advanced sophomore or upperdivision standing with overall grade-point average of 2.00 and, unless specifically waived, a grade-point average of 2.50 in chemistry and biology courses. Ordinarily, students should complete departmental requirements in biology and in inorganic and organic chemistry before applying for admission to the major.

Major Requirements: 45 credits in biological sciences, including BIOL 210, 211, 212 (preferred) or an equivalent 10 or 15 credits in botany or zoology, or both; minimum of 30 credits in microbiology courses, including MICRO 400, 401, 430, 431, 441, 442, 443, and 496 (MICRO 101, 301, 302, 351 cannot be used); PHYS 114, 115, 116 or 121, 122, 123; CHEM 140, 150, 151, 160; CHEM 231, 232 or 231, 235, 236 or 335, 336, 337 (three-quarter sequence preferred); CHEM 221; MATH 124 or 157 or Q SCI 281 or 291; a grade-point average of 2.00 in microbiology courses.

Double Degree Program in Medical Technology: A fiveyear program is offered by the departments of Microbiology and Laboratory Medicine to a limited number of students. The Microbiology Academic Affairs office, G313A Health Sciences, can be consulted for information on admission requirements.

Honors Program: Bachelor's degree "With College Honors in Microbiology" or "With Distinction in Microbiology." The honors adviser may be consulted about requirements.

#### Graduate Programs

Students who plan to pursue a graduate degree program

## ARTS AND SCIENCES

in microbiology should consult the "School of Medicine, Microbiology" section of this catalog.

## MUSIC

## 106 Music

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

#### Faculty

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

#### **Undergraduate Programs**

Admission Requirements: All music majors must qualify for private instruction in their major performance areas by audition and must pass an examination in basic piano. Students proficient in another instrument or voice, but deficient in basic piano, may begin their musical studies, but must enroll in MUSIC 136 until proficiency is established.

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

Courses	Credits
MUSIC 110, 111, 112	First-Year Theory (3,3,3) 9
MUSIC 113, 114, 115	Ear Training (1,1,1)
MUSIC 210, 211, 212	Second-Year Theory (3.3.3) 9
MUSIC 213, 214, 215	Music After 1750 (3.3.3)
MUSIC 310	Modal Counterpoint (3)
MUSIC 311	Tonal Counterpoint (2)
MUSIC 312	Contemporary Idioms (3)
MUSIC 313, 314	Music Before 1750 (3.3)
	Theory or history electives 10

**Bachelor of Arts Degree** 

#### MUSIC THEORY-HISTORY OPTION

Major Requirements: Music theory-history core, plus 9 credits upper-division vocal or instrumental instruction,

and 6 credits ensembles, for a total of 69 credits. Students who wish to pursue this option with emphasis in ethnomusicology should consult their music adviser regarding suitable electives, which include languages and area studies outside music; a 2.50 grade-point average in music is required for graduation.

#### VOCAL OR INSTRUMENTAL OPTION

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

#### Bachelor of Arts and Bachelor of Music Degree (Concurrent)

*Major Requirement:* A 2.50 grade-point average in music courses is required for graduation in the combined five-year Bachelor of Arts and Bachelor of Music degree programs.

#### COMPOSITION MAJOR

Courses			. 1															С	redits
Music theory-history core .			••		•													۰.	54
MUSIC 191, 291, 391, 491	C	om	po	siti	ioı	ı.									÷				. 24
MUSIC 487 Tonal Count	erp	oin	it.																3
MUSIC 280, 380, 381, 382	Ć	ond	iuc	tii	18	(1	.i.	i.	Ď		÷								4
Vocal or instrumental instr	ucti	on					,						Ì	÷	÷		÷		24
Ensembles				÷			÷												12
Music electives								÷	Ī	Ī	Ī	Ţ	Ţ		Ī		Ī	÷	6
	•••	•	•••	•		•••	•	•	•	•	•	•	ľ	•	•	·	•		
																			127

#### MUSIC HISTORY MAJOR

Courses		С	redits
Music theory-history core	• -		- 54
5 credits from MUSIC 316, 317, 318   Music Cultures of the	;		
World			·5
3 credits from MUSIC 400, 401, 402, 403			3
3 credits from MUSIC 404, 413, 416, 41, 420			3
3 credits from MUSIC 408, 411, 414, 418, 421			3
3 credits from MUSIC 409, 412, 415/ 419, 422, 423			3
Music history-literature electives	-		ğ
Music electives			ģ
Vocal or instrumental instruction			24
Ensembles	2		12
			126
			123

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, the music adviser should be consulted 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
MUSAP 479 Senior Recital	
MUSIC 323, 324, 325 Accompanying (2.2.2)	6
MUSIC 326, 327, 328 Repertoire (1,1,1)	3
MUSIC 434, 435, 436 Pedagogy (2.2.2)	6
Ensembles	1 15
	140

#### VIOLIN OR VIOLONCELLO MAJOR

Music theory-history core, to include 54   MUSIC 487 Tonal Counterpoint 54   MUSAP 161, 163, 261, 263, 361, 363 Private Instruction: 27   Violin-Viola, Violoncello 27   MUSAP 461, 463 (two years) Private Instruction: Violin-Viola, Violoncello   Viola, Violoncello 18
MUSIC 487 Tonal Counterpoint 54   MUSAP 161, 163, 261, 263, 361, 363 Private Instruction: 54   Violin-Viola, Violoncello 27   MUSAP 461, 463 (two years) Private Instruction: Violin-Viola, Violoncello 18
MUSAP 161, 163, 261, 263, 361, 363 Private Instruction:   Violin-Viola, Violoncello 27   MUSAP 461, 463 (two years) Private Instruction: Violin-   Viola, Violoncello 18
Violin-Viola, Violoncello 27   MUSAP 461, 463 (two years) Private Instruction: Violin-Viola, Violoncello   Viola, Violoncello 18
MUSAP 461, 463 (two years)   Private Instruction: Violin-     Viola, Violoncello   18
Viola, Violoncello
MUSIC 479 Senior Recital 1
MUSIC 434, 435, 436 Pedagogy (2,2,2)
MUSAP 140 Private Instruction: Piano or
MUSIC 236 Secondary Piano
MUSIC 280 Basic Principles of Conducting
Ensembles
124

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
MUSIC 479 Senior Recital	1
MUSAP 140 Private Instruction: Piano or	
MUSIC 236 Secondary Piano	6
MUSIC 233 Music Theatre Technique	1
MUSIC 309 Advanced Music Theatre Technique	. 1
MUSIC 323 Accompanying	. 2
MUSIC 326, 327, 328 Repertoire (1,1,1)	. 3
MUSIC 434, 435, 436 Pedagogy (2.2.2)	6
MUSIC 280, 380, 381, 382 Conducting (1.1.1:1)	. 4
Ensembles	. 12
	105

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

#### ORGAN MAJOR

Courses	Credits
Music theory-history core, to include	
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 (1,1,1)	. 3
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1)	. 4
Ensembles	. 12
	123

#### ORCHESTRAL INSTRUMENT MAJOR

Courses	Credit	ls.
Music theory-history core	' 5	4
MUSAP 166 through 176, 266 through		
276, 366 through 376 Private Instruction	2	7
MUSAP 466 through 476 (two years) Private Instruction .	1	8
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 ,	2	21
	13	11

#### 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 442 Instrumental Curriculum; Methods and	
Materials (3)	
MUSIC 443 Choral Curriculum: Methods and Materials (3	)
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1)	. 4

Major performance medium	<b>18–24</b> ·
Secondary performance medium	12-18
Performance electives	6
insemples (minimum of one year of choral ensemple	10
equirea)	12
	115-127

#### GENERAL MUSIC OPTIONS (ELEMENTARY AND SECONDARY)

Music theory-history core to include:

5 credits from MUSIC 316, 317, 318 (Music Cultures of the World) Music education methods to include:

MUSIC 440 (Music in Early Childhood); MUSIC 441 (Music in Later Childhood), for persons pursuing the elementary emphasis; MUSIC 432 (The General Music Class), for persons pursuing the secondary emphasis

The secondary or elective performance media, or both, must include

the following or equivalent proficiency: MUSIC 232 (Percussion Techniques); MUSIC 236 (Secondary Piano); MUSIC 237 (Class Instruction: Voice); MUSIC 240 (Guitar Techniques); and MUSIC 241 (Recorder Techniques).

#### INSTRUMENTAL OPTION

Music theory-history core to include:

MUSIC 334 (Band Arranging) or 490 (Orchestration)

Music education methods to include:

MUSIC 442 (Instrumental Curriculum: Methods and Materials) Major performance medium should be an orchestral or band instrument.

- The secondary or elective performance media, or both, must include the following or equivalent proficiency:
- MUSIC 126 (Basic Keyboard); 137, 138, 139 (Class Instruction: Voice); MUSIC 220, 221, 222, 223, 224, 225 (String Techniques I, II); MUSIC 226, 227, 228 (Woodwind Techniques); MUSIC 229, 230, 231 (Brass Techniques); and MUSIC 232 (Percussion Techniques).

Major performance medium must total 24 credits.

CHORAL OPTION

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

Major performance medium must total 24 credits.

#### **Bachelor of Music Degree**

The Bachelor of Music degree is intended for a limited number of specially qualified students who wish to emphasize professional training in performance within a four-year program. Required is a minimum of 180 credits, of which 60 must be taken in departments other than the School of Music. The 60 credits should include the basic proficiency requirement of the College of Arts and Sciences and (as a distribution requirement from the distribution list in this catalog) no less than 20 credits in each of two fields (humanities, social sciences, or natural sciences).

A grade-point average of 3.20 in music courses is required for graduation. All majors in this program must complete 54 credits in a theory-history sequence to include MUSIC 110, 111, 112, 113, 114, 115, 210, 211, 212, 213, 214, 215, 310, 311, 312, 313, 314, and 10 credits to complete the total.

#### PIANO MAJOR

Major Requirements: Music theory-history core; 50 credits in MUSAP 160, 260, 360, 460; MUSIC 379,

#### ARTS AND SCIENCES



479; 12 credits in ensembles; 6 credits in approved music electives. Total music credits: 122.

#### ORGAN MAJOR

*Major Requirements:* Music theory-history core; 50 credits in MUSAP 165, 265, 365, 465; MUSIC 379, 479; 12 credits in ensembles; 7 credits in approved music electives. Total music credits: 123.

#### VIOLIN OR VIOLONCELLO MAJOR

*Major Requirements:* Music theory-history core; 50 credits in MUSAP 161 or 163, 261 or 263, 361 or 363, 461 or 463; MUSIC 379, 479; 12 credits in ensembles; 8 credits in approved music electives. Total music credits: 124.

#### **VOICE MAJOR**

*Major Requirements:* 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

*Major Requirements:* Music theory-history core; 43 credits in MUSAP 166 through 176, 266 through 276, 366 through 376, 466 through 476; MUSIC 479; 21 credits in ensembles; 7 credits in approved music electives. Total music credits: 125.

#### COMPOSITION MAJOR

*Major Requirements:* Music theory-history core; 24 credits in MUSIC 191, 291, 391, 491; 12 credits in ensembles; 16 credits in vocal or instrumental instruction; 16 credits in approved music electives. Total music credits: 122.

#### TEACHING PROGRAMS

Information on four-year programs leading to the bachelor's degree and teacher certification at the secondary or elementary level appears in the "College of Education" section of this catalog.

#### HONORS PROGRAM

Bachelor's degree "With College Honors in Music" or "With Distinction in Music." The honors adviser must be consulted about requirements.

#### Graduate Programs

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

#### Master of Arts for Teachers Degree

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

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

#### Master of Music Degree

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

Admission Requirements: Audition required for entrance to performance, instrumental conducting, or composition. Entrance to other areas by permission.

Graduation Requirements: 36 credits, of which 18 must be in courses at the 500 level or above. Demonstration of proficiency in one language from French, German, Italian, or Latin. With Thesis—Program to include 9 credits in thesis. Without Thesis—A final oral examination is required.

#### Master of Arts Degree

Areas of Specialization: Music history, music theory, ethnomusicology, systematic musicology, music education.

Admission Requirements: Examination required for entrance to music history or music theory. Entrance to other areas by permission.

Graduation Requirements: 36 credits, of which 18 must be in courses at the 500 level or above and 9 in thesis. Demonstration of proficiency in one language from French, German, Italian, or Latin.

#### **Doctor of Musical Arts Degree**

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

Admission Requirements: Audition required for performance, instrumental conducting, and composition. Entrance to other areas by permission. Demonstration of proficiency in one language from French, German, Italian, or Latin.

Graduation Requirements: Three academic years of study; dissertation; in lieu of a full-length dissertation, a thesis in three parts may be substituted, of which one must be a research paper and two may be additional research papers, or musical compositions, or documented public performances, or lecture demonstrations, or the like.

#### Doctor of Philosophy Degree

Areas of Specialization: Historical or systematic musicology; ethnomusicology; music theory.

Admission Requirements: Examination required for entrance to historical musicology. Entrance to other areas by permission. Demonstration of proficiency in German and a second language from French, Italian, Latin, or other such language as is necessary for research.

Graduation Requirements: Three academic years of study; dissertation.

## NEAR EASTERN LANGUAGES AND LITERATURE 229B Denny

Languages presently offered are Arabic, the intellectual and literary medium of medieval Islamic culture; Hebrew, the chief language of the Old Testament; Persian, the medium for an interesting and attractive literature of great influence on Islam as a whole; Turkish, the language of the original Central Asian people who built the last great Islamic empire, the Ottoman; and the Semitic languages of Akkadian, Aramaic, and Ugaritic, important for their cultural and linguistic connections with other Near Eastern languages. Emphasis is on the ancient and medieval Near Eastern languages and literature, with some attention being paid to more recent cultural developments.

#### Faculty

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

#### Undergraduate Program

#### **Bachelor of Arts Degree**

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

#### **Graduate Program**

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

#### **Master of Arts Degree**

Admission Requirements: Statement of purpose; a sample of written work; three letters of recommendation, of which at least two must attest to scholarly ability.

Graduation Requirements: Graduate School requirements; a written examination consisting of three papers: (1) on the general culture of the Near East; (2) in the student's field of specialization; and (3) in the student's major language, together with a reading examination in a second Near Eastern language; research paper (a seminar paper representing the student's best work); reading knowledge of French or German.

## OCEANOGRAPHY

108 Oceanography Teaching

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

The University does not offer a major in marine biology, but courses related to that field are offered by the departments of Botany, Oceanography, and Zoology and the College of Fisheries. Summer Quarter instruction is offered both on the main campus and at the Friday Harbor Laboratories on San Juan Island.

#### Faculty

Maurice Rattray, Jr., Chairman; Francis A. Richards, Assistant Chairman for Research; Aagaard, Anderson, Baker, Banse, Campbell, Carpenter, Coachman, Creager, Criminale, Dugdale, Duxbury, Echols, English, Ewart, Fleming, Frost, Halpern, Healy, Henry, Hickey, Irish, Kelley, Kenner, Larsen, Lee, Lewin, Lewis, Ling, Lister, Lorenzen, Martin, McManus, Merrill, Murphy, Packard, Pavlou, Piper, Prinsenberg, Rattray, Richards, Roden, Smith, Sternberg, Taft, Walsh, Wearn, Welander, Whitledge, 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 labora-



tory if in physical option; choose a principal option and two supporting options in oceanography, of which one option must be physical oceanography.

#### **Bachelor of Science Degree**

Admission: Same as for the Bachelor of Arts degree.

Major Requirements: MATH 124, 125, 126; CHEM 140, 150, 151, 160; PHYS 121, 122, 123, with laboratory if in physical option; choose one principal option and three supporting options, which must include physical oceanography, and select 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 at least 13 credits in upper-division biology.

#### Chemical

CHEM 221, 231, 235, 236, 241, 242, 455, 456, 457, 460, 463; 3 credits above CHEM 402; OCEAN 421, 422, 423, 424, 444; and Q SCI 281.

#### Geological (Geology)

CHEM 350; GEOL 205, 301, 320, 321, 340, 361; ENGR 141; OCEAN 450, 451, 453, 457, and 3 creditsin geological oceanography above 400; Q SCI 381.

#### Geological (Geophysics)

CHEM 350; GEOL 205, 320, 321, 340; MATH 238, 324, 325; OCEAN 450, 451, 452 or 457, and 453; PHYS 221, 222, 223, 321, 322, 323.

#### Physical

ATM S 301; MATH 238, 327, 328, 427, 428; A A 370, 470; OCEAN 417, 418, 419; PHYS 221, 222, 223, 321, 322, 323.

#### SUPPORTING OPTIONS

Biological BIOL 101–102; OCEAN 433, 435.

Chemical CHEM 221; OCEAN 421, 423.

# Geological GEOL 205; OCEAN 405.

Physical OCEAN 401, 402 or 417, 418, 419.

Honors Program: Bachelor of Arts or Bachelor of Science degree "With College Honors in Oceanography" or "With Distinction in Oceanography." The honors adviser must be consulted about requirements.

#### **Graduate Programs**

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

#### Master of Science Degree

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

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

#### **Doctor of Philosophy Degree**

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

Graduation Requirements: Program planned by the student and his Supervisory Committee includes one principal option and three supporting options in oceanography and courses in science and mathematics. General Examination in oceanography and supporting fields. Dissertation. Final Examination.

## PHILOSOPHY

301 Parrington

Philosophy is the study of the basic concepts, fundamental principles, and leading arguments of the major intellectual disciplines. Its fields include logic, philosophy of science, epistemology, metaphysics, ethics, 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, Siegler, Small, Thomas. C. Marks, graduate program adviser.

#### Undergraduate Programs

#### Bachelor of Arts Degree

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

Honors Program: Bachelor's degree "With College Honors in Philosophy" or "With Distinction in Philosophy." The undergraduate adviser must be consulted about requirements.

#### **Graduate Programs**

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

#### Master of Arts Degree

Admission Requirements: An undergraduate major in philosophy is not required. Applicant's philosophical potential assessed primarily on the basis of a sample of written work in philosophy and secondarily on the basis of undergraduate record, Graduate Record Examination scores, and letters of recommendation. Reading knowledge of at least one foreign language is strongly recommended.

Graduation Requirements: Twelve courses in philosophy. The student must select three fields from at least two areas and take two courses in one field and three in each of the other two. Instead of a thesis, the student must submit four papers distributed over three areas. The graduate program adviser must be consulted for information.

#### Doctor of Philosophy Degree

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Admission Requirement: Admission based on level of performance in the Master of Arts degree program.

Graduation Requirements: General Examination, dissertation, and Final Examination. Teaching experience as a teaching assistant. Ability to read primary sources in their original language required for work in certain areas and on certain philosophers. Language requirements are determined by the student's Supervisory Committee.

## PHYSICAL AND HEALTH EDUCATION

## 101 Hutchinson

Physical and health education involves the study of human movement, with special emphasis on the biophysical and psychosocial parameters that affect and effect movement in the realm of sport, work, play, dance, and exercise.

#### Faculty

W. R. Morford, Director; Abernathy (emeritus), Broer (emeritus), Buckley, Cooley, Doolittle, Fox, Horne (emeritus), Hovis, Hughes, Hutton, Ingham, Kidwell (emeritus), Kunde (emeritus), Landers, Lawson, MacLean (emeritus), Mathews, Miller, Mills, Morford, Peek, Purdy, Reeves (emeritus), Renick, Skinner, Smoll, Torney (emeritus), Waltz, Wilson, Woods. T. L. Doolittle, graduate program adviser.

#### **Undergraduate Programs**

#### Bachelor of Arts Degree

PHYSICAL EDUCATION

#### **Human Movement Studies**

For students who wish to pursue careers in research and who plan to attend graduate school. Areas of concentration are biodynamics; movement development, control and learning; sociocultural correlates of sport and human movement.

Admission Requirements: A 3.00 grade-point average at time of entry or after one year in residence after having enrolled in a minimum of three courses in the required courses in the major; interview by an appropriate committee; written recommendation by a faculty member associated with the human movement studies program stating the academic qualifications and potential of the applicant.

Major Requirements: P E 250, 301, 302, 325, 331, 332, and 350; ZOOL 118 and 119 or 208; B STR 301; PSYCH 100; SOC 110; area of specialization, 20 approved credits beyond the courses listed above, including at least five departmental courses at the 400 level or above in, or related to, area of specialization.

#### Liberal Arts Emphasis

For students who wish to pursue a broadly conceived major that is nonprofessional by design.

Major Requirements: Same specified courses as for Human Movement Studies major; 20 credits beyond the specified courses at the 300 level or above (no fewer than four courses at the 400 level or above to be in-



cluded in these credits); achievement of advanced skill level in one movement activity.

*Teaching Program:* Teaching major or minor in physical education. Information on requirements appears in the "College of Education" section of this catalog.

#### HEALTH EDUCATION

#### School Health Education

Major Requirements: H ED 250, 292 or current advanced first-aid certification, H ED 350, 351, 352, 353; 26 additional approved credits in health education, nutrition, public health, psychology, sociology, communications, or related cognate courses.

#### **Community Health Education**

Major Requirements: H ED 250, 292 or current advanced first-aid certification, H ED 350, 351, 353; PC EP 420, PC EH 411, PC HS 323 or 424, PC BS 472, a field experience requirement; 15 additional approved credits in health education, nutrition, psychology, sociology, communications, or related cognate courses. B STR 301, MICRO 101 or 301, PSYCH 100, SOC 110, ZOOL 118 and 119 or 208.

*Teaching Program:* Teaching major or minor in health education. Information on requirements appears in the "College of Education" section of this catalog.

#### **Graduate Programs**

Master of Science and Master of Science in Physical Education Degrees

Admission Requirements: Aptitude portion of the Graduate Record Examination; letters of recommendation; background in the biological and social sciences; an undergraduate concentration in an appropriate field.

Graduation Requirements: The student, in consultation with a graduate program adviser, selects one or more of several emphases around which to design a program. Some programs may be completed in a year of full-time study by students who hold a baccalaureate degree and have a strong background, depending on the area of specialization. Two full years of study may be necessary for the students who enter with less undergraduate preparation or who hold appointments as teaching assistants. A thesis is required for the Master of Science degree.

## PHYSICS

#### 215 Physics

Physics is the study of the fundamental structure of matter and the interactions of its constituents, as well as the basic natural laws governing the behavior of matter.

#### Faculty

Ernest M. Henley, Chairman; Adelberger, Arons, Baker, Bali, Blair, Bodansky, Boulware, Brakel (emeritus), Brown, Cahn, Clark, Cook, Cramer, Dash, Davisson, Dehmelt, Fain, Farwell, Fortson, Geballe, Gerhart, Halpern, Henderson (emeritus), Henley, Higgs (emeritus), Ingalls, Kenworthy (emeritus), Kirkpatrick, Lee, Lord, Lubatti, L. McDermott, M. McDermott, Moriyasu, Neddermeyer (emeritus), Peters, Puff, Rothberg, Sabo, Sanderman (emeritus), Schick, Schmidt, Stern, Streib, Uehling (emeritus), Vilches, Weis, Weitkamp, Wilets, Williams, Young. D. Boulware, graduate program adviser.

#### **Undergraduate Programs**

#### **Bachelor of Science Degree**

Admission: Recommended preparation includes four units of college preparatory mathematics, one unit of physics, and one unit of chemistry.

Major Requirements: (1) Core courses. PHYS 121, 122, 123, 131, 132, 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 other upper-division physics sourses or approved courses in cognate subjects; (5) MATH 124, 125, 126, 238, 327, 328 or MATH 134H, 135H, 136H, 234H, 235H, 236H; (6) MATH 205 or 302; (7) 9 credits selected from natural sciences other than physics and mathematics, or from history or philosophy of science, in addition to any courses in these fields taken to fulfill requirement (4). Courses taken on a CR/NC or S/NS basis are not acceptable in fulfillment of requirements (1) through (6). Grades of C or better are required in all courses presented in fulfillment of requirements (1) through (4). Students who plan graduate study in physics are strongly advised to complete, in addition to courses listed in requirements (1) through (6), the following: PHYS 323, 324, 325, 331, 421, 422, 423, 424, 425, 426, 431, 432, 433 and MATH 427, 428, 429.

Honors Program: Bachelor's degree "With College. Honors in Physics" or "With Distinction in Physics." The honors adviser must be consulted about requirements.

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

#### **Graduate Programs**

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

#### 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 should include vector analysis, complex variables, ordinary differential equations, Fourier analysis, boundary value problems, and special functions. Advanced physics part of the Graduate Record Examination. In some cases in which the student has inadequate preparation but shows other evidence of ability in physics, admission is granted without a strong Graduate Record Examination score. In such cases, the student must pass a preliminary examination, usually during the first quarter of graduate study. Students who pass the preliminary examination with distinction (grade of A), along with those with a strong Graduate Record Examination score at admission, may proceed in a program leading to any graduate degree. Students who receive a grade of B may proceed only to the degree of Master of Science. A student who receives a grade of B or who fails the examination may repeat it only once, except by special departmental approval.

#### Master of Science Degree

Graduation Requirements: A minimum of 36 approved credits, of which at least 18 must be in courses numbered 500 or above. The 18 credits must include at least 3 credits in PHYS 600 and at least 12 in other physics graduate courses. No thesis is required. There is no foreign-language requirement. Final examination, usually oral.

#### **Doctor of Philosophy Degree**

Graduation Requirements: Background in physics equivalent to that provided by the following sequences of basic graduate courses: PHYS 505, 506; 513, 514, 515; 517, 518, 519; 524, 525; 527, 528, 529; and 566; specialized courses appropriate to each student's interests; at least B level in all courses; no foreign-language requirement; written qualifying examination (in second year), an oral General Examination for admission to candidacy (usually in the third year), and an oral Final Examination; teaching experience is required of all Candidates.

#### **Doctor of Arts in Teaching Degree**

Graduation Requirements: The same knowledge of basic physics required for the Doctor of Philosophy degree; a broad knowledge of physics, either by work within the Department of Physics or by work at the graduate level in a related field, such as astronomy, atmospheric sciences, biophysics, chemistry, geology, or

oceanography; suitable courses from history of science. philosophy of science, educational psychology, and education to develop a broad view of physics, its history and its role in society, and to gain awareness of developments in education and the theory of learning; written qualifying examination (in second year), oral General Examination for admission to candidacy in which a student is required to present a talk on a physics topic, at a level suitable for an undergraduate audience, and oral Final Examination; teaching and organization of an upper-division undergraduate laboratory course; at least two quarters of teaching internship, involving participation in organizing a course and in giving a substantial number of lectures; a dissertation, which may be based on an education project such as working up a course or developing laboratory experiments, an analysis and critique of some basic idea in physics, a review article, or the results of a modest research project.

## POLITICAL SCIENCE

201 Engineering Annex

Political science is the branch of the social sciences that deals with governmental and other political institutions, relationships, and belief systems, with the significance of the latter in the operation of societies, and with efforts to think systematically and normatively concerning governmental and other political phenomena.

#### Faculty

Richard E. Flathman, Chairman; Bone, Brass, Calhoun, Campbell, Cassinelli, Chandler, Cole (emeritus), Dolbeare, Flathman, Gore, Gottfried, Hellmann, Hill, Hitchner, Horowitz, Kroll, Lamare, Lev, Martin (emeritus), Meranto, Modelski, Mosher, Myhr, Pelowski, Reshetar, Riley, Rohn, Scheingold, Schuman, Shepro, Shipman, Townsend, Webster (emeritus). D. Hellman, graduate program adviser.

#### Undergraduate Programs

#### **Bachelor of Arts Degree**

Major Requirements: A minimum of 50 credits in political science, including 101 or 102. At least 10 credits in upper-division courses in each of the following three groups: Group I, Political Theory and Public Law; Group II, American Government, Politics, and Public Administration; Group III, Comparative Government and International Relations; 2.25 grade-point average in political science courses. Knowledge of one modern foreign language or of statistics recommended.

Honors Program: Bachelor's degree "With College Honors in Political Science" or "With Distinction in



Political Science." The honors adviser must be consulted about requirements.

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

#### **Graduate Programs**

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

#### Master of Arts Degree

Admission Requirement: Completion of an undergraduate major in political science or its equivalent.

Graduation Requirements: 36 credits, of which 18 must be at the 500 level or above; an essay of distinction to be submitted and a comprehensive examination to be passed in any three of the following areas: political theory and methodology; public law; comparative government; special area studies; public administration; international relations; American government and politics; urban, state, and regional government.

#### **Doctor of Philosophy Degree**

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

Graduation Requirements: 108 credits, of which at least 48 must be at the 500 level or above: 36 credits allowed for the dissertation; comprehensive examination, after completion of 72 credits, covering four fields. The student may choose from among the following seven areas, or, with the approval of the Supervisory Committee, prepare in one of the four fields in a related discipline: political theory and methodology; public law; comparative government and special area studies; public administration and comparative administration; international politics, international law, international organization, and foreign policy; American government, politics, and public policy; regional, state, metropolitan, and urban government. With Supervisory Committee approval, one of these areas may be used to satisfy two field requirements.

## PSYCHOLOGY

119 Guthrie

Psychology involves the scientific study of behavior and its causes and the management of human behavior in a variety of settings. Psychology is studied, either as a natural science, in which the stress is on physical and biological causes of behavior, or as a social science; in which stress is on how human behavior is affected by the social setting. Clinical, industrial, educational, and counseling psychologists translate scientific findings about behavior into applications in a wide variety of settings. Developmental psychology concerns itself with both the natural and social scientific study of how behavior develops from infancy through old age. The department has major areas of emphasis in the study of human cognition, animal behavior, physiological and sensory bases of behavior, personality and clinical psychology, developmental psychology, and social psychology. The department does not have programs in educational psychology (listed in the "College of Education" section of this catalog), career counseling, engineering psychology, or philosophic foundations of psychology.

#### Faculty

Earl'Hunt, Chairman; Barash, Beach, Becker, Bolles, Broedel, Carr, Chapman, Culbert, Dale, Doerr, Douglas, Edwards, Evans, Fenner, Fiedler, Fields, Finkel, Horst (emeritus), Horton (emeritus), Hunt, Hutton, Keating, Kobler, Kohlenberg, Landers, Lewis, J. Lockard, R. Lockard, E. Loftus, G. Loftus, Loucks (emeritus), Lumsdaine, C. Lunneborg, P. Lunneborg, Makous, Marlatt, McKeever, T. Mitchell, Moore, Nelson, Pagano, Perry, Reitan, Robinson, Rose, Sackett, Sarason, Sax, Scontrino, Slaby, M. Smith, R. Smith, Steele, Stotland, Strother (emeritus), Sue, Teller, Wagner, Wolfle, Woodburne, Woods, Zaro. I. Sarason, 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 100 or 101), 231, 232 (or 233), 217, 218, 499, plus 10 credits each in social science psychology and in natural science psychology (listed below), and electives to total 50 credits; 35 additional credits in other disciplines, to include MATH 105, 106, 157 (or 124), 5 credits in physics or chemistry, 5 credits in physical anthropology, GENET 351 (or 451), 10 credits in biology or zoology; 3.00 overall grade-point average in all courses completed at the University of Washington and 3.30 grade-point average in all psychology courses. Transfer students must meet all above requirements but need complete only 15 credits in psychology at the University of Washington. Social science psychology courses-PSYCH 205; 210, 250, 260, 305, 306, 320, 345, 361, 405, 410, 414, 442, 443, 444, 445, 446, 447, 449, 457, and 489. Natural science psychology courses-PSYCH 105, 200, 222, 355, 400, 403, 406, 407, 409, 416, 417, 418, 421,

422, 423, 424, 425, 427, 429, 430, 434, 441, 461, 462, 463, 465, 468, and 475. (Note: The courses listed above as "social science" or "natural science" psychology courses are so designated as fulfilling requirements for the psychology major, but not necessarily as fulfilling the College of Arts and Sciences distribution requirement. A list of psychology courses that apply to the College of Arts and Sciences distribution requirement appears in the distribution list in the "College of Arts and Sciences" section of this catalog.)

#### Bachelor of Arts Degree

Major Requirements: 50 credits in psychology courses —PSYCH 101 (or 100 or 102), 231 (or 232 or 233), 213 (or 217, 218), and electives to total 50 credits (497 recommended); MATH 106 is a prerequisite to PSYCH 213 but is not a required course; 2.00 gradepoint average in all psychology courses. Transfer students must meet all above requirements but need complete only 15 credits in psychology at the University of Washington.

Honors Program: Bachelor of Science or Bachelor of Arts degree "With College Honors in Psychology" or "With Distinction in Psychology." The honors adviser must be consulted about requirements.

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

#### **Graduate Programs**

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

#### **Master of Science Degree**

Optional degree choice for doctoral students.

Admission Requirements: Same as for the Doctor of Philosophy degree. Department does not admit to its graduate program those students whose sole intention is to obtain a master's degree.

Graduation Requirements: Completion of first-year graduate programs and an appropriate research program, including a research thesis. There is no foreign-language requirement.

#### Doctor of Philosophy Degree

Admission Requirements: Undergraduate degree in psychology is not required; some preparation in biological or social sciences is strongly advised. Applicants are judged on their academic and research backgrounds, on Graduate Record Examination aptitude scores, and on written evaluations submitted by former professors or supervisors. Students with little training in psychology may be required to complete preliminary work in undergraduate courses. Admission of new students usually occurs in Autumn Quarter only.

Graduation Requirements: For graduate instruction, department is organized into several content areasanimal behavior; physiological, human experimental, quantitative, developmental, social, and clinical psychology; and personality. Essential requirements include minimal competencies in four of the content areas mentioned above, experimental design, minor and major area requirements, independent research, General Examination, dissertation, and Final Examination. 3.00 grade-point average overall must be maintained; 3.00 grade-point average required for all courses used to satisfy minimal competency and minor requirements. There is no foreign-language requirement. First-year requirements-demonstrate competence in experimental design (514-515); complete two of the area minimal competency requirements; complete at least 3 credits in independent predoctoral research.

## ROMANCE LANGUAGES AND LITERATURE

C104 Padelford

In Romance languages and literature, students study French, Spanish, Italian, Portuguese, Catalan, Provencal, or Romanian.

#### Faculty

Marcelino C. Penuelas, Chairman; Algeo, Anderson, Bodden, Christofides, Contreras, Creore, Dale, Daniels, David, Ellrich, Field, Friedman, Friedrich, Hanzeli, Jones, Keller, Klausenburger, J. Leiner, W. Leiner, Nostrand, Pace, Penuelas, Petersen, Predmore, Salinero, Saporta, Shipley, Vargas-Baron, C. Wilson, W. Wilson (emeritus). Wortley. A. Pace, graduate program adviser.

## **Undergraduate Programs**

## Bachelor of Arts Degree

MAJOR REQUIREMENTS

*French:* 51 credits in courses beyond FREN 203 or 222, including 301, 302, 303; 304, 305, 306; 350, 351, 352; 403 or ROM 401; FREN 409; 12 credits in approved courses in literature or civilization, or both, at the 400 level, including at least 6 in literature (none of these 12 credits may be transfer credits or courses in translation).

Spanish: 45 credits in courses at the 300 and 400 levels, including SPAN 301, 302, 303; 304, 305, 306; two



courses in the 350 group; 409 or ROM 401; 15 credits, none of which may be transfer credits, of literature courses numbered 400 or higher. The undergraduate adviser for Spanish must be consulted to determine alternate ways of satisfying the 400-level requirement.

*Italian:* 39 credits in courses at the 300 and 400 levels, including ITAL 301, 302, 303; 6 credits of 327; 401; 404, 405, 406; 12 additional credits in literature courses at the 400 level.

Romance Linguistics: For admission, two college years (or equivalent) of study in each of two Romance languages. For graduation, 20 credits in third-year language courses in two Romance languages (recommended distribution: 10 credits each); 15 credits in literature, including a complete survey sequence; two 400-level courses in language structure; ROM 401 and 402; SPAN or FREN 474; a senior essay (2 credits). Recommended electives: general linguistics courses. Majors must begin course work in Romance and general linguistics by start of junior year.

Honors Programs: Bachelor's degree "With College Honors in French/(Spanish)," or "With Distinction in French/(Spanish)." The honors adviser for French or Spanish may be consulted about requirements.

*Teaching Programs:* Teaching major or minor in French or Spanish. Information on requirements appears in the "College of Education" section of this catalog.

#### **Graduate Programs**

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

#### Master of Arts Degree

*Programs:* French language and literature, Spanish language and literature, Italian language and literature, Romance linguistics. French includes a special option for practicing teachers.

Graduation Requirements: 36 credits, of which at least half must be in courses at the 500 level; reading knowledge of a second foreign language other than the major one; comprehensive written final examination. Master of Arts with thesis permitted upon prior approval by the departmental Graduate Studies Committee. Spanish offers option of nine additional course credits in lieu of written final examination.

#### **Doctor of Philosophy Degree**

*Programs:* French language and literature, Spanish language and literature, Romance literature, Romance linguistics.

Admission Requirements: Appropriate Master of Arts degree and approval by a departmental graduate advising and admission board.

Graduation Requirements: 90 applicable course credits, of which at least 50 must be in courses numbered 500 or above; evidence of basic competence in bibliography and research methods, Romance linguistics, and history of one Romance language; reading knowledge of two languages other than the major one.

## SCANDINAVIAN LANGUAGES AND LITERATURE C8B Padelford

The Department of Scandinavian Languages and Literature offers training in the skills of reading, speaking,

ature offers training in the skills of reading, speaking, and writing in Danish, Norwegian, and Swedish; study of respective literatures and cultures; linguistic study of the Scandinavian languages; courses given in English in such areas as Scandinavian culture, mythology, folklore, history, novel, drama, and film.

#### Faculty

Birgitta Steene, Chairman; Arestad (emeritus), Beijbom, Conroy, Flatin, Hildeman, Jarvi, Johnson (emeritus), Rossel, Sehmsdorf. B. Steene, graduate program adviser.

## **Undergraduate Programs**

## **Bachelor of Arts Degree**

*Major Requirements:* At least 50 credits, of which 25 must be upper division. Danish major: SCAND 380, 381, 382, 461; DAN 101–102, 103, 220, 221, 222, 300, 301, 302, 350, 450, and 490. Norwegian major: SCAND 380, 381, 382, 461; NORW 101–102, 103, 220, 221, 222, 300, 301, 302, 450, and 490. Swedish major: SCAND 380, 381, 382, 461; SWED 101–102, 103, 220, 221, 222, 300, 301, 302, 450, and 490. Other courses will be substituted with the approval of the adviser.

Honors Program: Bachelor's degree "With College Honors in Danish/(Norwegian, Swedish)" or "With Distinction in Danish/(Norwegian, Swedish)." The honors adviser must be consulted about requirements.

*Teaching Program:* Teaching major or minor in Norwegian or Swedish. Information on requirements appears in the "College of Education" section of this catalog.

#### **Graduate Programs**

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

#### Master of Arts Degree

Admission Requirement: Bachelor of Arts degree with major in Danish/(Norwegian, Swedish) or equivalent background.

Graduation Requirements: A minimum of 36 credits in courses or seminars in Scandinavian and related subjects approved by the department, 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 Examinations for admission to candidacy; an acceptable dissertation; a Final Examination on the dissertation.

## SLAVIC LANGUAGES AND LITERATURE

111 Thomson

The Department of Slavic Languages and Literature offers instruction in the principal East European languages and literatures and in Slavic linguistics, working closely with the Institute for Comparative and Foreign Area Studies. Languages include Bulgarian, Cźech, Hungarian, Polish, Romanian, Russian, and Serbo-Croatian.

#### Faculty

Jack V. Haney, Chairman; Augerot, Coats, Gribanovsky, Gross, Hagglund, Holdsworth, Kapetanic, Konick, Kramer, Micklesen, Novikow (emeritus), Pahn, Scherr, Swayze, Trnka, West. W. Konick, graduate program adviser.

#### **Undergraduate Programs**

#### Bachelor of Arts Degree

#### RUSSIAN OPTION

Major Requirements: RUSS 301, 302, 303, or the equivalent; RUSS 401, 402, 403, or the equivalent; RUSS 321, 322, 323; 15 credits from approved elec-

tives within the department; 10 credits from courses approved by the departmental adviser.

#### EAST EUROPEAN LANGUAGES OPTION

Major Requirements: Three years of Russian and two years of a second East European language; course work in the literatures, history, and geography of the cultures involved, and in Slavic philology; senior research project.

Honors Program: Bachelor's degree "With College Honors in Slavic Languages and Literature" or "With Distinction in Slavic Languages and Literature." The honors adviser must be consulted about requirements.

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

#### **Graduate Programs**

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

#### **Master of Arts Degree**

Admission Requirement: Bachelor of Arts degree with major in Russian or East European languages and literatures, or equivalent background.

Graduation Requirements: Programs in Russian literature or Slavic linguistics arranged by the student with a faculty adviser. Proficiency examination in Russian and reading examination in either French or German. Thesis not required

#### **Doctor of Philosophy Degree**

Admission Requirement: Master of Arts degree with major in Russian literature or Slavic linguistics.

Graduation Requirements: Two years' residency beyond the Master of Arts degree; comprehensive written and oral examination; dissertation and Final Examination. Individual programs arranged by the student with a faculty adviser.

## SOCIETY AND JUSTICE

B102 Padelford

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

Ezra Stotland, Director

## ARTS AND SCIENCES



#### Undergraduate Program Bachelor of Arts Degree

Major Requirements: Courses in the context of the criminal justice system, to include one course from each of seven lists, covering the following: anthropological and historical; philosophical, personality development, and functioning; group processes; minority groups and discrimination; public administration and politics; constitutional and legal. Core courses: five courses selected from eleven lists of courses concerned with deviance, crime, criminology, juvenile delinquency, system of justice, law, corrections, law enforcement, drugs, etc. Research courses: 15 credits in methodology and research courses or individual projects of a quantitative or 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.

## SOCIOLOGY

202 Savery

Sociology involves the analysis of the forms, processes, and consequences of interaction among persons, groups, and organizations, and analysis of social structure, especially those features affecting social change, the integration of societies, the growth and distribution of population, the functioning of social institutions, and the individual in society.

#### Faculty

Herbert L. Costner, Chairman; Barth, Black, Blalock, Blumstein, Bose, Burgess, Campbell, Cohen, Cook, Costner, Dodd (emeritus), Emerson, Faris (emeritus), Gross, Guest, Hargens, Hayner (emeritus), Hechter, Larsen, McCann, Miyamoto, Preston, Roberts, Roth, Schmid (emeritus), Schmitt, Schrag, Schwartz, Stark, van den Berghe, Wager. H. L. Costner, graduate program adviser.

## Undergraduate Programs

## **Bachelor of Arts Degree**

Admission Requirement: Junior standing (90 credits or more), including 10 graded credits in sociology courses taken at the University of Washington, with a gradepoint average for those courses of at least 2.50.

Major Requirements: SOC 110, 223, and 40 additional credits in sociology, with a grade-point average of 2.50 in all sociology courses taken at the University of Washington.

Honors Program: Bachelor's degree "With College Honors in Sociology" or "With Distinction in Sociology." The honors adviser must be consulted about requirements.

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

#### Graduate Programs '

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

#### Master of Arts Degree

Admission Requirements: Undergraduate major in sociology not required but preferred. Applicants judged on performance in relevant courses and overall undergraduate grade record; Graduate Record Examination scores; applicant's statement of educational goals and plans; and letter of recommendation.

Graduation Requirements: SOC 428-429, an advanced two-quarter statistics course, either 410 or 411, any four of six area courses designed for first- and secondyear graduate students (SOC 513, 514, 516, 517, 518, 519), 9 credits of SOC 700 (thesis), and sufficient additional credits to bring the total graduate credits to 45. In addition, the student must take the Master of Arts degree examination and present an acceptable thesis.

#### Doctor of Philosophy Degree

Admission Requirements: Master of Arts degree in sociology, or special permission; applicants judged on performance in relevant courses; Graduate Record Examination scores; letters of recommendation; for applicants who complete a Master of Arts degree in this department, general evaluation of graduate work including Master of Arts examination and Master of Arts thesis; and, for applicants with a Master of Arts degree from another department, applicant's statement of educational goals and plans.

Graduation Requirements: A minimum of 9 credits in approved courses in a related or supporting field. Successful completion of examinations in research methodology, in two substantive divisions, and in an analytic specialty. Additional information about examinations may be obtained from the graduate program adviser. Successful completion of a dissertation and Final Examination.

## SPEECH

## 107 Parrington

The study of speech focuses upon the human communication process, especially upon the use of speech, hearing, and language. A variety of teaching, research, and laboratory perspectives are applied to communication concepts within the subject areas of rhetoric and public address, speech communication science, oral interpretation of literature, speech pedagogy, speech pathology and audiology, and speech science.

#### Faculty

Thomas Nilsen, Chairman; Abbs, Arundale, Baskerville, Bennett, Bird (emeritus), Booth, Bosmajian, Campbell, Carlsen, Carpenter, Carrell, Crowell (emeritus), D'Angelo, Douglas, Espinola, Franzke (emeritus), Hédrick, Hogan (emeritus), Klyn, Meador, Miner, Minifie, Nelson (emeritus), Nilsen, Nyquist, Palmer, Post, Prather, Prins, Rahskopf (emeritus), Reeves, Sparks, Stephenson, Stewart, Tiffany, G. Thompson, Weber, Weybright, Wilson, Yantis. B. Baskerville, graduate program adviser.

#### Undergraduate Programs Bachelor of Arts Degree

Admission Requirements: Students transferring to a major in speech after entrance to the University must have a cumulative grade-point average of 2.50 in all University courses unless otherwise authorized by the department.

Major Requirements: Majors in general speech-55 approved credits, including SPCH 102, 140 (or 220), 270 (or 373), 300 (or 301 or 302), and 400, and an additional required 5 credits in area of concentration; of the 27 remaining speech elective credits, 18 must be at the 400 level; 25 of the remaining credits in upperdivision speech courses, of which 15 must be at the 400 level; 2.50 grade-point average in all speech courses. Preprofessional majors in speech pathology and audiology-55 credits, including SPCH 103 (or 220), 250, 301, 302, 303, 304, 306, 330, 331, 332, 350, 371, 390, 454, and 5 credits in 351 and 391; 2.50 grade-point average in all speech courses; professional preparation for clinical work in the area of communication disorders requires completion of at least 45 credits in approved courses acceptable for a graduate degree (400 level and above).

*Teaching Programs:* Majors in speech education seeking state certification at the elementary or secondary teaching level and those wishing state certification as communication disorders specialists should see the program listings in the "College of Education" section of this catalog.

#### **Graduate Programs**

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

#### Master of Arts Degree

Graduation Requirements: With Thesis—45 approved credits, including SPCH 501 (or 504 or equivalent), of which 18 must be at the 500 level or above and 9 in thesis. Without Thesis—45 approved credits, including SPCH 501 (or 504 or equivalent), including one seminar in area of specialization and 10 credits in supporting courses from closely related areas; two major seminar papers. Nonthesis program not available to majors in speech pathology and audiology.

### Master of Speech Pathology and Audiology Degree

Graduation Requirements: 45 approved credits in courses at the 400 level or above, of which 23 must be at the 500 level or above; satisfaction of academic and practicum requirements for certification by the American Speech and Hearing Association; satisfactory demonstration of clinical competence in area of specialization. This is a professional degree program that is not designed to prepare the student for doctoral study.

## Doctor of Philosophy Degree

The following major areas of specialization are available: rhetoric and public address, including speech communication science, oral interpretation of literature, and speech pedagogy; speech science, including phonetics, speech physiology, and speech perception; and speech pathology or audiology, including hearing science and language disorders.

## WOMEN STUDIES

C14 Padelford

Women studies is an interdisciplinary program drawing on the academic resources of many departments. Students in the women studies program are asked to ground themselves in a single department offering courses relevant to women studies, and to prepare a senior thesis integrating their educational objectives and subject matter. The women studies courses are planned to foster open, rigorous inquiry about women, to challenge curricula in which women are absent or peripheral, to question cultural assumptions in light of new information, and to create a supportive environment in which "men and women are the measure of human experience." Students interested in a bachelor's degree program centering on women studies should consult an adviser in C14 Padelford.

Mary Rothschild, Acting Director

### ARTS AND SCIENCES



## ZOOLOGY

106 Kincaid

Zoology is that branch of natural science concerned primarily with the characteristics of animals, their development, structure, and function, and their relationships with their animate and inanimate environments.

#### Faculty

Donald S. Farner, Chairman; Bakken, Cloney, Deyrup-Olsen, Edmondson, Edwards, Farner, Fernald, Gorbman, Griffiths, Hatch (emeritus), Illg, Kohn, Kozloff, Laird, Martin, Orians, Osterud, Paine, J. Palka, Y. Palka, Ray, Riddiford, Rohwer, Scholander, Schubiger, Snyder, Strathmann, Stuiver, Truman, Whiteley, Willows.

#### **Undergraduate Programs**

#### Bachelor of Science Degree

*Major Requirements:* A minimum of 50 credits, with a grade-point average of 2.00, to include BIOL 210, 211, 212, ZOOL 433, 434 (or 453–454), 456; plus 400-level lecture and laboratory courses in physiology or cell biology, or both, to total 8 credits; GENET 451, BIOL 472; electives to be selected from approved upper-division biological courses. Additional requirements: CHEM 140, 150, 151, 231, 232 (or 231, 235, 236), 241, 242; MATH 124, 125, 126 (or 124, 125, Q SCI 281; or Q SCI 281, 291, 292); PHYS 114, 115, 116 (or 121, 122, 123); two years of French, German, Japanese, Russian, Chinese, or Spanish acceptable. Approved lists of biology courses and alternatives to courses specified are available from a zoology adviser.

#### **Bachelor of Arts Degree**

Major Requirements: A minimum of 50 credits, with a grade-point average of 2.00, to include BIOL 210, 211, 212, or 101-102 with a grade of A or B, GENET 451, plus a program of upper-division courses in the major

areas of biology to be selected in consultation with the zoology adviser. Additional requirements: CHEM 140, 150, 151, 231, 232; MATH 105; PHYS 114, 115, 116 recommended.

Honors Program: Bachelor of Science or Bachelor of Arts degree "With College Honors in Zoology" or "With Distinction in Zoology." The honors adviser must be consulted about requirements.

#### **Graduate Programs**

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

#### Master of Science Degree

Admission Requirements: Acceptance by the Graduate School and the department.

Graduation Requirements: Satisfy the requirements of the department for the Bachelor of Science degree. With Thesis—36 credits, of which 18 must be at the 500 level or above and 9 in thesis research; satisfy the departmental foreign-language and teaching requirements; thesis; final examination. Without Thesis—Substitute 9 credits of course work at the 500 level or above for thesis; satisfy the departmental foreign-language and teaching requirements; final examination.

#### Doctor of Philosophy Degree

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

Graduation Requirements: A minimum of three academic years of study, one quarter of which is spent at a biological field station; satisfy the departmental foreign-language and teaching requirement; General Examination; dissertation; Final Examination. Descriptions of the current graduate programs in zoology are available upon request.



# 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 Business*, published quarterly by the Graduate School of Business Administration, and the *Journal of Financial and Quantitative Analysis*, a specialized journal published each month jointly with the Western Finance Association. Monographs published by the Graduate School of Business Administration include topics of general interest to the business community, as well as topics of a scholarly nature.

To serve the continuing education needs of business persons, the School and Graduate School of Business Administration offer a number of short programs, either University initiated or cosponsored with various community and industry organizations. The executive development program, designed for upper-management personnel, focuses on self-renewal in a society that is experiencing an accelerating pace of change. The management program is designed for middle-to-uppermanagement. Offerings in the various small business series courses assist owners and managers of small businesses in planning, organizing, and operating their businesses. Other continuing education activities



include the Annual Business Outlook Conference, the Tax Clinic for Small Business, the Entrepreneurship Symposium, Pacific Coast Banking School, and the Savings and Loan School for Executive Development. Information on the continuing education program may be obtained from the management conference coordinator, 543–4987, or the Office of Short Courses and Conferences, 543–5280.

#### **Student Organizations**

Chapters of Alpha Kappa Psi, Beta Alpha Psi, Beta Gamma Sigma, as well as the Business Student Association, Finance Club, Graduate Association of Black Business Students, International Association of Students in Economics and Commerce, Marketing Club, Pan Xenia, and Student Advisory Council provide opportunities for undergraduate students to meet informally and to participate in a variety of projects and events. The goals and interests of graduate students are served by Beta Gamma Sigma, the Graduate Association of Black Business Students, the International Association of Students in Economics and Commerce, the M.B.A. Association, and the Ph.D. Association.

#### **Undergraduate Program**

Associate Dean

Warren W. Etcheson 139–140 Mackenzie

#### **Undergraduate Office**

137 Mackenzie 543–4350

The School of Business Administration, with admission at the junior level, offers a two-year program leading to the degree of Bachelor of Arts in Business Administration. The curriculum, building upon a basic foundation in the arts and sciences, provides exposure to a wide range of functional business areas and the opportunity for study in selected areas in some depth.

#### **Bachelor of Arts in Business Administration Degree**

Specific School Admission Requirements: A minimum of 90 credits with at least a 2.00 cumulative grade-point average, including the following (or equivalents): 19 credits in natural sciences, including 5 credits in college-level mathematics and 4 credits in calculus (MATH 157 or 124); 30 credits in social sciences, including 10 credits in macroeconomics and microeconomics (ECON 200 and 201) and 10 credits in anthropology, psychology, and/or sociology; 10 credits in humanities; ACCTG 210, 220, 230; Q METH 200, 201; BG&S 200; 11 elective credits. Applicants who meet the University and School of Business Administration requirements at the time they transfer are eligible to be placed directly in the school; those who meet the University entrance requirements, but not the business administration requirements, are eligible to be placed in the College of Arts and Sciences as prebusiness majors. If the number of eligible applicants exceeds that for which the space is available, acceptance will be competitive, based on grade-point average.

Specific Upper-Division School Requirements: B ECN 300, 301; MKTG 301; OPSYS 301; BG&S 333; FIN 350; A ORG 440, 460; B POL 470 or 471 or 480; and a minimum of 19 credits of 300- or 400-level business administration electives (or area of concentration).

Specific School Graduation Requirements: (See also "Graduate Programs and Degree Policies," page 57.) No more than 9 lower-division business elective credits; a minimum of 72 non-business administration credits, including those listed under "Specific School Admission Requirements," and 72 business administration credits, including those listed under the preceding two requirement sections; and a cumulative grade-point average of at least 2.00 in all business administration credits earned at the University of Washington.

Information on credits by examination or credits granted through the College Level Examination Program, Armed Forces Training School, or independent study may be obtained from the undergraduate office, School of Business Administration.

#### Double Bachelor's Degrees and Second Bachelor's Degree

Students who wish to earn double degrees should consult an adviser in the business administration office, preferably sometime during the junior year. Persons who seek a second bachelor's degree should apply at the University of Washington Undergraduate Admissions Office. To be considered, applicants must complete by quarter of entry MATH 157 or 124, ECON 200, 201, and ACCTG 210, 220, 230, BG&S 200; Q METH 200, 201, or their equivalents. If the number of eligible applicants exceeds that for which space is available, acceptance will be competitive, based on the gradepoint average of the junior and senior years, or last 90 credits.

#### Areas of Study

Course work in various areas of study is offered within five departments as follows:

## ACCOUNTING

231 Mackenzie

Accounting involves development and communication of financial and operational information for business

and nonprofit economic entities. Courses provide a foundation for careers in accounting (public, industrial, private, governmental, or institutional), for a general business career, or for professions such as law. The notation "Accounting" will be included on the permanent record, or transcript, of a student who graduates with a degree of Bachelor of Arts in Business Administration and who completes with a grade-point average of at least 2.00 the following courses: ACCTG 301, 302, 303, 411, 421, and 6 elective credits in 400-level accounting courses, except 475, 490, and 499.

#### Faculty

Gerhard Mueller, Chairman; Berg, DeCoster, Elliott, Felix, Frink, Heath, F. Johnson (emeritus), Martin, May, F. Mueller, Porter, Prater, Ramanathan, Rhode, Schafer, 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; S. Brown (emeritus), Goldberg, Hart, Jamieson (emeritus), Lessinger, Marcus, Robinson, Seyfried, Strong, Teachout, Wheeler (emeritus), Wickman.

## FINANCE, BUSINESS ECONOMICS, AND QUANTITATIVE METHODS 270 Mackenzie

Finance, Business Economics, and Quantitative Methods facilitates understanding the financial, economic, and quantitative aspects of decision making. Business Economics applies theoretical knowledge of economics to the maximization of firm goals and to an understanding of the economics environment within which business operates. The Finance curriculum focuses on understanding the environment of the financial manager, money and capital markets of the economy, problems and decision structure allocation of capital within the firm, and viewpoints of capital suppliers. Courses in Quantitative Methods concentrate on the mathematical and statistical tools used to analyze administrative problems and to arrive at decisions.

#### Faculty

Alfred Page, Chairman; Adolphson, Alberts, Borque, Chiu, D'Ambrosio, Diehr, Faaland, Frost, Haley, Henning, Hess, Higgins, Jacob, D. Johnson, King, 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; Bell, E. Brown (emeritus), Buck, Fenn, Fiedler, French, Gross, D. Henning, R. Johnson, Kast, Kienast, Knowles, Knudson, LeBreton, Meier, Mitchell, Newell, Peterson, Piehl, Rosenzweig, Schreiber, Scott, Summer, Sutermeister, Vesper, Woodworth.

## MARKETING, INTERNATIONAL BUSINESS, TRANSPORTATION, AND BUSINESS COMMUNICATIONS

156 Mackenzie

Marketing provides knowledge of concepts and relationships in the areas of consumer behavior, channels of distribution, determination and measurement of markets, pricing, physical movement of goods, product development and mix, promotions, and sales administration. International Business includes trade, payments, and multinational corporate systems and activities. The area prepares students for international responsibilities in domestic business firms, governmental agencies, and overseas business. Courses in Business Communications stress the writing dimension as it relates to business; also included are theory and techniques of effective communication in interpersonal relationships. The transportation curriculum offers a carrier orientation through examination of the transportation industry, or a logistics orientation through concentration on managerial aspects of the buying of physical distribution services.

#### Faculty

John C. Narver, Chairman; Denman, Engle (emeritus), Etcheson, Gordon, Grathwohl, Harder, Kolde, R. Little, W. Little, MacLachlan, Miller (emeritus), Moinpour, Moxon, Murphy, Oshikawa, Spence, Spratlen, Truitt, Wagner, Wheatley.

#### **Graduate Programs**

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

#### Associate Dean and Graduate Program Adviser

Wendell L. French 109 Mackenzie

#### Admission

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Qualified students who are graduates of the University of Washington or of other colleges or universities of recognized rank may be admitted Summer Quarter or Autumn Quarter to graduate, degree programs. Grade-point average, as well as other factors, is considered in the admission process. Students who do not meet the grade-point average requirements may be considered for admission if they can be properly accommodated, have achieved a high score on the Admission Test for Graduate Study in Business, or submit letters of recommendation or other evidence that they could succeed in graduate study. Inquiries concerning the details of admission should be made to: University of Washington, Graduate School of Business Administra-

#### **BUSINESS ADMINISTRATION**



tion, Mackenzie Hall, DJ-10, Seattle, Washington 98195.

#### **Application Procedure**

In early March, the Admissions Committee reviews applications for Summer Quarter and Autumn Quarter. Decisions are made at that time, and applicants receive notice of the decision soon thereafter. Those applying between March 1 and April 1 are given consideration for any remaining spaces.

#### **Programs of Study**

The Graduate School of Business Administration offers courses leading to the degrees of Master of Business Administration, Master of Arts, and Doctor of Philosophy. Graduate training is given in these areas: accounting; administrative theory and organizational behavior; business administration research methods; business economics; business policy; business, government, and society; finance; human resource systems; international business; marketing; operations and systems analysis; quantitative methods; urban development.

The above listing should not be understood to exclude others that may become appropriate in special instances. There is no foreign-language requirement for the degrees of Master of Arts, Master of Business Administration, or Doctor of Philosophy.

Two options are offered in the master's degree programs: the Master of Business Administration and the Master of Arts in the business field.

#### Master of Business Administration

The M.B.A. program is designed for students who have earned undergraduate degrees from accredited colleges. The nature of the degree, however, is not a limiting criterion. In each entering class of students, diversity is sought from backgrounds in the social sciences, physical sciences, mathematics, law, engineering, medicine, or business, as well as other fields.

Students are advised to prepare themselves in basic mathematics and in introductory computer programming, both needed for problem analysis in the program. Such courses are offered during Summer Quarter and may be taken by students who do not have this background, but are planning to start the program Autumn Quarter. In general, the program starts each Autumn Quarter for the majority of entering students. One section of thirty-five students starts Summer Quarter.

The master's degree programs require two years, or six quarters, of study for most students. Much of the first year is taken up with courses that introduce students to the broad range of disciplines relevant to administration and provide them with the necessary background for more specialized study. The second year is devoted largely to elective courses selected by the student to meet particular career interests and objectives.

When appropriate, some first-year courses may be waived. Such waivers are granted at the discretion of the department offering the course or courses in question. The granting of a waiver may be based on proficiency or qualifying examinations or other criteria as stipulated by the particular department.

The first-year requirements include courses in accounting, administrative theory and organizational behavior, economics, finance, marketing, operations and systems analysis, public policy, and quantitative methods. Second-year requirements include a research report; a course in business policy; and a course in business, government, and society. In addition, 24 credits in electives are required.

A variation of the first-year requirements is being introduced in 1973/74 for a two-year experimental period. Under this plan, a student may complete the first-year requirements in two quarters.

#### Master of Arts Degree

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The M.A. program is designed for students who desire greater specialization than is possible under the M.B.A. program.

Students in the M.A. program must also complete these first-year requirements; at least 15 credits, exclusive of thesis credit, in a major field of business; 9 credits in a minor that may be taken in another department or another college or school. In addition, they must complete a thesis (9 credits).

#### **Minor in Business Administration**

Students working for a master's degree in other colleges who elect a minor in the Graduate School of Business Administration must have as a background 15 credits in acceptable courses in business administration. The student must earn a minimum of 15 credits in approved upper-division and graduate courses in one field of business administration.

#### Doctor of Philosophy Degree

A requirement for consideration for admission to the doctoral program is a grade-point average of at least 3.25 during the preceding year of graduate study and submission of a score for the Admission Test for Graduate Study in Business. An applicant is required to have completed a master's degree prior to study toward the doctoral degree. Applications for admission to the doctoral program must be accompanied by three letters of recommendation, of which at least two must be from former instructors.

Requirements of Study: The doctoral program is designed to provide advanced study in business administration for persons preparing for careers in teaching, research, business, or government. Since the inception of the program, the majority of its graduates have entered university teaching careers. Students who complete this program are expected to possess the professional administrative competency that is the objective of the M.B.A. program, and are required to demonstrate academic competence in four areas of study, of which at least three normally are in the Graduate School of Business Administration. In addition, the student must show evidence of competency in business research and computer technology and a knowledge of economics and mathematics pertinent to his area.

Admission to Candidacy: The General Examination consists of written and oral parts in all of the prospective candidate's areas. A student may sit for all written examinations in a single quarter or for individual area examinations as scheduled during three consecutive academic quarters. Remaining requirements are completion of the doctoral dissertation and the Final Examination. Additional information may be obtained by writing to: University of Washington, Graduate School of Business Administration, Graduate Programs, 109 Mackenzie, DJ-10, Seattle, Washington 98195.

# DENTISTRY

## Dean Sheldon Rovin C301 Health Sciences

In the School of Dentistry the student learns fundamental principles significant to the entire body of dental knowledge and is expected to acquire habits of reasoning and critical judgment that enable him to implement that knowledge. To the School of Dentistry, the future development of the student is as critical as his professional training, and the program of instruction is designed to equip him, as a practicing dentist, with the knowledge and qualities necessary for solving problems of oral health and disease.

The School of Dentistry expects its students to learn the fundamentals of the basic health sciences, to master certain clinical skills, and to acquire a thorough understanding of professional and ethical principles. In addition, the program is designed to emphasize the modern concepts of dental practice that make appropriate use of dental auxiliary personnel. Emphasis is placed on the role of the dentist in his community and his professional obligations in responding to the oral needs of the total population. The four-year program encompasses these objectives.

The School of Dentistry is approved by the Council on Dental Education of the American Dental Association and is a member of the American Association of Dental Schools. It is a participating member of the Western Interstate Commission for Higher Education. The School of Dentistry offers a four-year program of courses leading to the degree of Doctor of Dental Surgery (D.D.S.) and programs leading to the degree of Master of Science in Dentistry (M.S.D.) for students in the Graduate School. The faculty in oral biology offers a graduate program leading to the degrees of Doctor of Philosophy and Master of Science.

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

The four-year curriculum for the D.D.S. degree includes study in two main areas: basic sciences and clinical dental sciences. Instruction in the basic sciences is provided by the departments of Biological Structure, Biochemistry, Microbiology, Pathology, Pharmacology, and Physiology and Biophysics, and the School of Public Health and Community Medicine of the Health Sciences Division. In the clinical dental sciences the departments of Community Dentistry, Dental Hygiene, Endodontics, Oral Biology, Oral Diagnosis and Treatment Planning, Oral Surgery, Orthodontics, Pedodontics, Periodontics, Prosthodontics, and Restorative Dentistry provide instruction in the fields of general dental practice and dental specialization.

As an integral part of the School of Dentistry, the Department of Dental Hygiene has the same basic objectives, and it offers courses of instruction leading to the degree of Bachelor of Science with a major in dental hygiene.

#### Admission

The School of Dentistry maintains as much flexibility as possible in predental requirements. It would be unrealistic, however, to assume that the student will be able to master the courses in the dental school curriculum without adequate preliminary preparation in predental study.

For this reason, the applicant is strongly urged to enroll in courses in general chemistry, organic chemistry, physics, zoology, and embryology. BIOC 405 (Introduction to Biochemistry) and MICRO 351 (General Microbiology) are firm predental requirements. All/ other requirements may be challenged by the applicant with equivalent and adequate background.

Equally important for the professional student is a background in the social sciences and the humanities. English literature, economics, sociology, psychology, physical or cultural anthropology, and philosophy are excellent scientific and humanistic studies for the predental student. The requirements in these last subjects are far more flexible than are those mentioned above and may range over a practically unlimited area, because professional persons should be informed and possess a wide cultural background.

The personal attributes of applicants most sought by the admission committee are maturity, social awareness, and initiative.

Neither a prior degree nor a minimal number of predental credits is required for admission. Currently, however, students who are being accepted into the School of Dentistry have, on the average, completed more than 180 credits.

#### **Application Procedure**

Application is to be made to the American Association of Dental Schools Application Service (AADSAS) on a form obtainable in the Office of Dental Admissions. This is a central application service designed to facilitate and expedite the processing of materials for the applicant. Application materials and instructions are furnished by AADSAS. The deadline for application is November 1 of the year prior to that for which the applicant is applying.

After formal application has been made and the Committee on Dental Admissions determines that the applicant is eligible for further evaluation, the applicant receives from the Office of Dental Admissions a card acknowledging receipt of the application and a request for the following supplementary materials:

1. At least four letters of recommendation, two of which must contain personal evaluation by science in-

structors (one letter if forwarded by the preprofessional committee of the school), and two from business or professional persons. The School of Dentistry does not provide a form for recommendations.

2. Physician's statement of physical examination taken within the previous twelve months.

3. Predental grade-point-average computation.

4. Autobiographical résumé.

5. A list by title and credit of those courses presently being taken and those planned for the future.

All supplementary materials should be sent to the Office of Dental Admissions, University of Washington School of Dentistry. It is the applicant's responsibility to ensure that the transcripts are forwarded to this office at the end of each quarter or semester. Without these records it is impossible for the office to evaluate academic preparation, and scholastic achievement or to advise applicants concerning their course of study.

#### Processing of Applications

The dental admissions committee attempts to enroll enough qualified students from the state of Washington to comprise eighty percent of the freshman class. The remaining twenty percent of the students are enrolled mainly from other areas of the United States, with some consideration given to those states that are joined with the state of Washington in the Western Interstate Commission for Higher Education and that have no dental schools. These states are Alaska, Arizona, Hawaii, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. To be eligible for this program, the student must be certified by his or her home state. State eligibility requirements vary, and the number of students that can be included in the program each year depends on appropriations by the legislature of each state. A student interested in this program must apply to the certifying officer in his or her home state, whose address may be obtained by writing to the Western Interstate Commission for Higher Education, P.O. Drawer P, Boulder, Colorado 80302.

After acceptance of applications ceases (November 1), each applicant is notified by mail regarding the exact status of his or her application (i.e., what material has been received and what-material still must be submitted to the committee).

When the applicant's file is completed, members of the Committee on Dental Admissions examine the credentials of the applicant and base the applicant's acceptability on evaluation of the applicant's preprofessional



training, evidence of scholarship, dental admission test rating, recommendations from predental instructors and character references, maturity, social awareness, motivation, initiative, goal orientation, and health. An interview is held with one or more members of the committee if the committee, as a result of reviewing the applicant's record, deems it necessary. When the entire committee meets, it reviews the completed records and makes one of three decisions. The application is accepted, rejected, or held for additional study.

The Committee on Dental Admissions prefers that all predental requirements be met before the student enters the School of Dentistry. A provisional acceptance may be given with the understanding that the predental requirements will be completed within a reasonable period. Those students taking predental education at institutions other than the University of Washington should consult with the predental committee of their schools to determine the equivalent course requirements.

The committee places strong emphasis on the applicant's predental academic performance. Included in the evaluation is the applicant's overall grade-point average, the grade-point average on the required courses, and, particularly, the courses taken and the grades earned during the most recent quarters of study.

The dental admission test is given strong consideration if the applicant scores well. The committee realizes, however, the stressful conditions under which this test is sometimes conducted, and some allowance is made for this factor.

Recommendations and suggestions by predental instructors and predental advisers are given serious consideration.

#### **Dental Admission Test**

Each predental student who applies for admission to the School of Dentistry is required to take the dental admission test given under the auspices of the Council on Dental Education of the American Dental Association. This test is given in October, January, and April at the University of Washington and other schools throughout the country. Full information about the test is sent to each applicant for admission. It is desirable that the applicant participate no later than the October testing period just prior to the November 1 application deadline date.

#### **Personal Interview**

After all material pertinent to the application has been received and reviewed, the candidates may be requested to appear for a personal interview.

#### Notification of Acceptance or Rejection

Each applicant is given written notice of the acceptance or rejection of the application as soon as possible after the Committee on Dental Admissions has reached a decision. Each applicant generally is informed of the committee's decision sometime prior to July 1.

#### Honor Code

Each student accepted by the School of Dentistry is expected to indicate his willingness to participate in the school's honor code.

#### **Tuition Fee Deposit**

When an applicant has been notified that he is accepted by the School of Dentistry, he must deposit \$50 with the Comptroller of the University. This deposit is applied to the first quarter's tuition. It is refundable only in cases of withdrawal for bona fide illness, failure to complete basic predental requirements, or induction into military service.

#### Promotion

At the end of each academic year the evaluation committees for each of the years of the curriculum of the School of Dentistry evaluates the accomplishments of each student during the year and determines fitness for promotion. When promotion is not recommended, the student is subject to dismissal from the school. The School of Dentistry reserves the right to dismiss any student from the school for any reason it deems sufficient. Scholastic standing is not the only requirement for promotion. Students are advanced only when their general attitude, scholastic progress, and personal attributes are considered satisfactory.

#### **Awards and Honors**

Department of Prosthodontics Award: Certificates are presented to two senior students for academic and clin-' ical excellence in prosthodontics.

Seattle Pedodontic Society David B. Law Award: A plaque and a one-year subscription to the Journal of Dentistry for Children are presented to a senior student who has shown excellence in the management of child patients, as well as in clinical proficiency.

American Society of Dentistry for Children Award: A certificate of merit, a one-year subscription to the Journal of Dentistry for Children, and a one-year membership in the society are presented to a senior student who has shown outstanding interest and achievement in clinical pedodontics.

American Academy of Oral Pathology Award: A plaque and a one-year subscription to Oral Surgery,

Oral Medicine, and Oral Pathology are awarded to a senior student who has shown the most interest, accomplishment, and promise in the field of oral pathology.

American Academy of Gold Foil Operators Award: A certificate of merit and a one-year subscription to the Journal of the American Academy of Gold Foil Operators are presented to a senior student who has shown outstanding qualities as a scholar and clinician in operative dentistry, with proficiency in accomplishing direct gold restorations.

American Academy of Periodontology Award: A certificate of merit and a one-year subscription to the Journal of Periodontology are presented to a senior student who has excelled in the field of periodontics.

American Academy of Oral Medicine Award: A certificate of merit and a copy of the Journal of Oral Medicine are presented to the senior student who is outstanding in the field of oral medicine.

American Student Dental Association Preventive Dentistry Award: A plaque is awarded by the American Student Dental Association to an outstanding junior dental student for his contribution to preventive dentistry.

Mosby Book Awards: These scholarship book awards are presented to five senior students who have made significant contribution to dentistry. These certificates of award will permit selection of any one Mosby Book with a catalog list price not exceeding \$30.

American College of Dentists Award: The Washington-British Columbia Section of the American College of Dentists presents an award to a student selected on the basis of scholarship, a conscientious effort im achieving the goals of his dental school program, and potential for future growth in the profession.

Alpha Omega Fraternity Award: This plaque is presented by the Alpha Omega national fraternity to the senior dental student with the highest scholastic average for his or her four years of dental studies.

*Omicron Kappa Upsilon Membership:* Omicron Kappa Upsilon is the national dental honor society, which was established to honor students of dentistry who have distinguished themselves in terms of both scholarship and character and who possess outstanding qualifications for future professional growth. No more than twelve percent of any graduating class may be elected to membership by the faculty. Washington State Dental Association Award: This plaque is presented to a senior student who has demonstrated character and leadership, together with high scholastic achievement, during the four-year course.

Dennis P. Duskin Inspirational Award: This award is given to a senior who has shown outstanding character, personality, and integrity throughout his or her dental education. The winner is selected by a majority of the class.

Sigma Phi Alpha Membership: Sigma Phi Alpha is a national honor society that was established to promote scholarship and to honor character among students of dental hygiene. No more than ten percent of any graduating class may be elected to membership by the faculty.

Washington State Dental Hygienist's Association Award: A plaque is presented to the senior dental hygiene student whose clinical performance has been outstanding and who shows promise of those qualities of leadership necessary for the advancement of the profession.

#### **Scholarships**

Annual Scholarship Award: This annual gift of \$250 is awarded by the Oral-B Toothbrush Division of Cooper Laboratories to a student who has completed the junior year and who is felt to be the most worthy to receive the award.

Ben and Betty Zukor Scholarships: Three awards of \$225 each are presented to needy and worthy students from the undergraduate classes of the School of Dentistry.

Group Health Dental Cooperative Harry and Naomi Levine Scholarship: An award in the amount of \$200 is presented to a freshman student felt to be the most deserving, based on scholastic achievement.

Washington Dental Education Foundation Scholarship: An award of \$150 is presented to a sophomore student, based upon scholarship and need as well as a dedication to dentistry.

Berton E. Anderson Scholarship: An award of \$100 is given to the junior student possessing the highest ideals of leadership, enthusiasm, and scholarship by the Delta Sigma Delta dental fraternity.

Randy Carr Memorial Scholarship: An award of \$200 is presented to a junior student, based upon need, with emphasis on the recipient's sincerity, reliability, and enthusiasm.

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Alpha Omega Scholarship: An award of \$100 is presented by the Seattle Alumni Chapter of Alpha Omega national dental fraternity to a freshman dental student showing both scholarship and need.

Omicron Kappa Upsilon Scholarships: Awards of \$100 each are presented by Sigma Sigma Chapter to undergraduate dental students with the highest academic standing in their respective classes.

Group Health Dental Cooperative Harry and Naomi Levine Scholarship for Dental Hygiene: An award of \$100 is presented to a deserving junior student in dental hygiene.

Washington State Dental Hygienists' Association Scholarship: An award is presented to a junior dental hygiene student, based on need, academic achievement, and initiative.

#### **Research Grants**

Grants-in-aid for sponsored research and special projects in the School of Dentistry totaled approximately \$974,000 during the past year. About \$664,000 was received from government agencies, and \$230,000 was received for training grants and contracts.

#### **Financial Aid to Students**

Additional loan fund information may be obtained through the Office of Student Financial Aid, 170 Schmitz.

#### Fees

Undergraduate dental students, 1973/74: residents, \$280; nonresidents, \$613; Summer Quarter part-time dental students, \$117-\$260. Graduate dental students (according to number of credits): residents, \$73-\$208; nonresidents, \$167-\$547. Summer Quarter graduate dental students, \$53-\$188.

#### **Departmental Programs**

The School of Dentistry offers courses leading to the degrees of Doctor of Dental Surgery (D.D.S.), Bachelor of Science (B.S.), and Master of Science in Dentistry (M.S.D.), as well as certificates in endodontics, orthodontics, pedodontics, periodontics, and restorative dentistry. The faculty of the Department of Oral Biology offers programs leading to the degrees of Master of Science and Doctor of Philosophy.

#### **Doctor of Dental Surgery Degree**

Upon their completion of the four-year curriculum in the School of Dentistry, the D.D.S. degree is awarded to applicants who (1) have given evidence of good moral character; (2) have completed the last two years of dental training as regularly matriculated students in the School of Dentistry; (3) have completed satisfactorily all the required work with a grade-point average of at least 2.00; (4) have fulfilled all special requirements; and (5) have discharged all indebtedness to the University.

Work leading to the degrees listed below also is offered in the School of Dentistry.

#### Bachelor of Science Degree

The curriculum leading to the Bachelor of Science degree is given by the Department of Dental Hygiene.

#### Master of Science and Doctor of Philosophy Degrees

The curriculums leading to the degrees of Master of Science and Doctor of Philosophy are given by the Department of Oral Biology through the Graduate School.

#### Master of Science in Dentistry Degree

The curriculums leading to the degree of Master of Science in Dentistry are given by the various clinical departments of the School of Dentistry through the Graduate School.

#### **Certificates in Clinical Divisions of Dentistry**

Programs are not administered by the Graduate School; a thesis is not required.

The school also provides professional training in the areas of basic science, for which the Bachelor of Science degree may be awarded by the College of Arts and Sciences, upon completion of the requirements for a major and approval of the department concerned.

#### Licensure

Admission to the practice of dentistry in any state is conditional upon the applicant's meeting the requirements of its state board of dental examiners. In the state of Washington, admission to practice is dependent upon the applicant's having a D.D.S. or a D.M.D. degree and passing the examination conducted semiannually by the Staté Board of Dental Examiners. The basic science examination may be waived if the candidate presents credentials showing he or she has passed parts 1 and 2 of the National Board Dental Examination.

Additional information about licensure requirements and time of examinations may be obtained from the Division of Professional Licensing, Olympia, Washington 98501.

#### **Programs in Clinical Dental Sciences**

Basic sciences in dentistry are listed in the "School of Medicine" section of this catalog under the departments
of Biochemistry, Biological Structure, Microbiology, Pathology, Pharmacology, and Physiology and Biophysics.

# COMMUNITY DENTISTRY

The Department of Community Dentistry is concerned with the social, legal, political, economic, and psychological aspects of dental health care delivery.

#### Faculty

Peter Milgrom, Chairman; Anderson, Guild, Hall, Sharp, Weinstein.

# ENDODONTICS

The Department of Endodontics provides training in the diagnosis and treatment of disease of the pulps of teeth. In addition to the courses for undergraduate dental students, the department offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry. The department also offers a course of study leading to a Certificate of Specialty Training in Endodontics.

#### Faculty

Eugene Natkin, Chairman; Harrington, Mandel, Standifer, Van Hassel.

# ORAL BIOLOGY

Oral biology is concerned with basic biological mechanisms in normal and diseased oral tissues and structures. The department offers courses for undergraduates, professional students in the health sciences, and graduate students. The department offers programs for graduate students working toward the degrees of Doctor of Philosophy, Master of Science, or Master of Science in Dentistry.

#### Faculty

Murray Robinovitch, Acting Chairman; Enwonwu, Gordon, Izutsu, Keller, Middaugh, Morgan, Ross, Siegel, Sreebny, Stiefel, Tamarin.

# ORAL DIAGNOSIS AND TREATMENT PLANNING

The Department of Oral Diagnosis and Treatment Planning provides training in diagnostic techniques, such as interrogation, examination, and radiographic interpretation. The student learns to correlate information gained in the various departments and to plan both ideal and practical treatment for the patient. The department offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry with a specialization in oral medicine.

### Faculty

Edmond L. Truelove, Chairman; Patten, Rovin, Severson, Soltero, Sommers.

# ORAL SURGERY

The Department of Oral Surgery provides training and clinical experience in the procedures used for all types of operations in the oral cavity. The department also gives graduate and undergraduate dental students instruction and experience in all phases of dental pain control. This instruction ranges from the handling of chronic pain problems to the use of intravenous sedation for routine dental procedures. Sedation experience for the students is provided in all clinical departments of the School of Dentistry. In addition to the courses for undergraduate dental students, the department offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry with a specialization in oral surgery.

#### Faculty

James R. Hooley, Chairman; Bloomquist, Gehrig, Gordon, Pederson, Tolas, Topping, West.

# PAIN CONTROL

The Division of Pain Control is concerned with providing graduate and undergraduate dental students with instruction and experience in all phases of dental pain control. This instruction ranges from the handling of chronic pain problems to the use of intravenous sedation for routine dental procedures. Sedation experience for the students is provided in all clinical departments of the School of Dentistry.

Director

Dale S. Bloomquist

# ORTHODONTICS

The objective of orthodontics is the prevention and correction of malocclusion of the teeth. In addition to the courses for undergraduate dental students, the De-

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partment of Orthodontics offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry with a specialization in orthodontics.

#### Faculty

Richard A. Riedel, Chairman; Cohen, D'Anna, Joondeph, Keller, McNeill, Moffett, Moore, Newell.

# PEDODONTICS

The objective of the Department of Pedodontics is to provide the student with a broad understanding of the growth and development of the child and the principles of preventive dentistry, plus a working knowledge of the skills necessary for the maintenance of optimal dental health. In addition to the courses for undergraduate dental students, the Department of Pedodontics offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry with a specialization in pedodontics.

### Faculty

John Peterson, Chairman; Davis, Domoto, Law, Lewis, Rolla.

# PERIODONTICS

In the teaching program of the Department of Periodontics, students learn about the periodontium in health and disease, how to diagnose periodontal diseases, and how to treat diseases that affect the periodontal tissues. The department also offers graduate study and training in periodontics at the certificate and advanced degree levels.

# Faculty

William Ammons, Chairman; Campbell, Dale, Decker, Drennan, Erickson, Goldman, Haglund, Heins, Levine, Ogilvie, Page, Schluger, Selipsky, Stern.

# PROSTHODONTICS

The Department of Prosthodontics provides instruction in the fabrication and maintenance of removable complete and partial dentures. The department also operates the maxillofacial prosthetic clinic, which is a service clinic available to the public and all departments of the University for treatment that lies in the maxillofacial field of prosthetics. In addition to the courses for undergraduate dental students, the Department of Prosthodontics offers a twenty-one-month specialization program for students in the Graduate School working toward the degree of Master of Science in Dentistry. The department also offers a course of study leading to a Certificate of Achievement.

#### Faculty

Charles L. Bolender, Chairman'; Beder, Frank, Hill, Lord, Lowe, Lukens, Palmer, Smith, Swoope, Toolson.

# RESTORATIVE DENTISTRY

The Department of Restorative Dentistry is concerned with the restoration or replacement of tooth structure lost through disease or trauma and, consequently, it is involved in the study of the form and function of the masticatory structures.

#### Faculty

Kenneth Morrison, Chairman; Canfield, Halpin, Hamilton, Hodson, Jacobson, Johnson, Moller, Murdock, Nicholls, Ostlund, Powell, Robson, Smith, Stibbs, Strand, Teel, Warnick, Weaver, Willey, Wills, Yuodelis.

# CONJOINT COURSES

Conjoint courses are offered cooperatively by departments in the School of Dentistry. They are designed to integrate clinical training in two or more fields.

# DENTAL HYGIENE

The curriculum of the Department of Dental Hygiene offers a professional program leading to the baccalaureate degree. The Bachelor of Science degree, with a major in dental hygiene, requires two academic years of pre-dental hygiene courses followed by two additional years of enrollment in the dental hygiene program.

The undergraduate student receives didactic information and clinical experience in all areas of preventive dentistry through association with clinical patients, community dental health programs, and school health programs. The curriculum versatility allows undergraduates the opportunity to gain experience in assuming positions as clinical dental hygienists, auxiliary program educators, community services program administrators, or research assistants. A ladder approach for admission to dental school is provided.

The preventive, educational, and clinical skills include plaque control; patient education and communication techniques; techniques for prevention of dental caries; removal of soft and hard deposits from root surfaces in association with root planing, polishing, and soft-tissue curettage procedures; exposing and processing radiographic surveys; administration of local anesthetics; placement of restorations in tooth surfaces prepared by a dentist; and performance of other preventive services delegated by the dental profession.

It is expected that the dental hygiene student will understand the role of dentistry in the health care of society and that the profession's first obligation is to the public.

#### Faculty

Martha H. Fales, Director; Anderson, Brooks, Chin, Farrell, Hoople, Howard, Jacobs, Kennar, Koch, Laine, Langslet, Wells, Westland.

# **Basic Curriculum**

The College of Arts and Sciences offers a pre-dental hygiene program, particulars of which may be found in the section of this catalog dealing with the College of Arts and Sciences. Students transferring into this program from other institutions should consult the "Description of Courses" section of this catalog, compare the courses listed with those given in their schools, and seek the advice of the Director of Admissions for course equivalents. Because the number of students admitted to the program is restricted, early communication with the department is urged.

# **Pre-Dental Hygiene Education**

Admission to the two-year dental hygiene program requires the completion of the courses listed below. Because many courses are taken with dental students, the same prerequisites are stipulated.

MATH 105 or equivalent, 5 credits; CHEM 140, 150, 151, 160 (general), 14 credits; CHEM 231, 232 (organic), 6 credits; BIOL 101–102, 211 or BIOL 210, 211, 212, 15 credits; PSYCH 100 or 101, 5 credits; SOC 110, 5 credits; SPCH 103, 5 credits; ZOOL 456, 5 credits; plus electives to complete 90 quarter credits.

# **Application Procedure**

Persons seeking acceptance into the program must submit the following to the Department of Dental Hygiene on or before March 1 of the year in which they wish to enter:

1. Formal application form, as provided by the Department of Dental Hygiene.

2. Official transcripts of high school and college records (provided directly from the registrar's office at each institution in which the pre-dental hygiene education was obtained).

3. A plan for completion of the requirements. (The applicant must provide additional transcripts to show courses completed during each quarter subsequent to the submission of the application.)

4. Two letters of recommendation.

The Committee of Dental Hygiene Admissions examines the credentials of each applicant and bases its decision on an objective evaluation of preprofessional education and scholastic records and residential status, as well as an evaluation of personal characteristics as determined by interview. Candidates are given written notice of the status of their applications.

# **Graduation Requirements**

To qualify for the Bachelor of Science degree with a major in dental hygiene, the student must meet both the basic proficiency and distribution requirements of the College of Arts and Sciences and of the curriculum in dental hygiene. A total of 180 credits is required for graduation.

# Baccalaureate Curriculum for Certificate Dental Hygienists

The baccalaureate curriculum for certificate dental hygienists provides certified dental hygienists the opportunity to complete the baccalaureate program and to broaden clinical education with courses in liberal arts, humanities, and basic sciences. A minimum of 10 credits in the Department of Dental Hygiene and the completion of one advanced course in clinical techniques also are required. Persons who enter the curriculum must have a valid license to practice dental hygiene.

# **Master of Education Degree**

A master's degree program in education in the field of higher education is available in the Graduate School. This program allows for specialization in dental hygiene teaching. Additional information may be obtained from the University of Washington, College of Education, Department of Higher Education. Some W. K. Kellogg Foundation traineeships are available.

# CONTINUING DENTAL EDUCATION

Continuing dental education is offered to provide dentists, auxiliary personnel, and others involved in health care with current scientific knowledge and methodology



of patient treatment. A number of short, intensive courses are available. These courses originate from local, national, and international sources to provide this service. A broad spectrum of interests is represented, and curriculum is dictated by current needs of the health professions. A list of forthcoming courses may be obtained from the office of the Director.

#### Director

Thompson M. Lewis

# GRADUATE PROGRAMS

Also see "Graduate Programs and Degree Policies," <sup>•</sup> page 57.

# Associate Dean and Graduate Program Adviser Saul Schluger

# **Master of Science in Dentistry Degree**

The School of Dentistry offers programs leading to the degree of Master of Science in Dentistry with specialization in endodontics, oral medicine, oral surgery, orthodontics, pedodontics, periodontics, prosthodontics, or restorative dentistry. The Department of Oral Biology also offers programs leading to the degrees of Master of Science and Doctor of Philosophy.

#### **Application Procedure**

Applications are received and processed throughout the school year from applicants desiring to work for a Master of Science in Dentistry degree with a specialization in any one of the fields previously listed. Applications for admission to the graduate dental curriculum must be submitted with all necessary credentials to Graduate Dental Education on or before December 1 for consideration for entrance in the following Autumn Quarter. This application deadline is not consistent with other University application deadlines, and it applies to all students seeking admission to graduate study in dentistry. Applicants must observe this deadline in order to ensure prompt attention to credentials and prompt replies to correspondence.

#### Admission

An applicant may be admitted to the Graduate School to undertake work leading to a Master of Science in Dentistry degree, provided that he or she meets the admission requirements of the University of Washington Graduate School and is a graduate of a dental school approved by the Council on Dental Education of the American Dental Association or of a university dental school located outside of the North American continent whose curriculum and admission requirements are similar to those of the University of Washington School of Dentistry.

An applicant's acceptance as a student must be approved by the Graduate Admissions Committee of the School of Dentistry. Such approval is based upon the availability of places in the various classes. The capacity number of students for each specialization commencing Autumn Quarter is as follows: four in endodontics, two in oral biology, three in oral medicine, three in oral surgery, eleven in orthodontics, three in pedodontics, eight in periodontics, two in prosthodontics, and two in restorative dentistry. Applicants selected by the Graduate Admissions Committee in Dentistry are recommended to the Dean of the Graduate School for admission to the Graduate School.

### Residence

A minimum of seven consecutive quarters, or twentyone months, of residence is required for the Master of Science in Dentistry degree in the fields of oral biology, orthodontics, pedodontics, prosthodontics; eight quarters, or twenty-four months, in endodontics, oral medicine, periodontics, or restorative dentistry; and four quarters, or twelve months, of residence for oral surgery, plus a two-year hospital residence. A foreign language is not required. New students for graduate training in periodontics are accepted on the basis of a dual program consisting of certificate (residency) training in the clinical disciplines, with progression parallel to the standard master's or doctoral program in the basic science choice of the student. Such students must be admitted to the Graduate School and must meet the requirements for the master's or doctoral degree in the basic science field.

#### **Programs of Study**

The programs of study are planned to prepare students to think independently, to evaluate their own services and the literature of the programs, and to develop their clinical operative skills to a level that permits the successful practice of their chosen specialty. Emphasis is placed upon the basic principles of diagnosis and treatment, knowledge of which represents one of the clinician's most valuable assets. The seminar method of teaching is generally used. The purpose of the programs is not only to train students in the art of their respective specialties but also to encourage basic science research in the specialties on a graduate level in preparation for possible careers in either teaching or research. The research may be undertaken in the field of specialization or in cooperation with other departments. The opportunity for collaborative research is excellent, due to the proximity of the other colleges and departments to the University.

# **Class Schedules**

The graduate programs of the School of Dentistry operate on the quarter system of the University. The academic school year has three eleven-week quarters.

In order for the graduate dental programs to be continuous, the Summer Quarter also has been made an elevenweek quarter, equivalent in length to the other quarters of the school year.

#### **Postdoctoral Training**

Requirements for admission to the postdoctoral training programs of study for certificates in the various major clinical fields are similar to those for admission to graduate study for the master's degree. The postdoctoral student is required to maintain the same academic standards as the graduate student.

These programs are not administered by the Graduate School, and a thesis is not required. The course content may vary somewhat from the graduate program, depending upon the department in which the program is taken.

Following the successful completion of the prescribed courses by the postdoctoral student during the required residency, a certificate in endodontics, oral medicine, orthodontics, pedodontics, periodontics, or restorative dentistry is granted by the School of Dentistry. The fees each quarter are the same as for graduate training, and the residency requirements remain the same. Additional information may be obtained from the University of Washington School of Dentistry, Associate Dean, Graduate Dental Education.

# **Master of Science Degree**

A program leading to the Master of Science degree is offered by the faculty in oral biology. The admission requirements for this degree program are a Bachelor of Science or higher academic degree and a minimum of seven quarters in residence. The purpose of this program is to train qualified teachers and investigators in the clinical and basic science disciplines. The program is designed to accommodate the interests and abilities of individual students.

# **Doctor of Philosophy Degree**

The Department of Oral Biology offers an advanced program of study and research leading to the Doctor of Philosophy degree. This graduate program prepares students for professional careers in universities and colleges, in research institutes, in hospitals, and in government laboratories, such as those of the National Institutes of Health. Students in this program receive broad training in oral biology and other biomedical basic science areas. Dissertation research is carried out under the guidance of members of the graduate faculty in oral biology. The laboratories of the Department of Oral Biology are excellently equipped for the conducting of biomedical investigations from a number of approaches, including morphological, ultrastructural, biochemical, and physiological. Students who intend to work toward a Doctor of Philosophy degree must meet the requirements of the Graduate School as outlined in the "Graduate Study" section of this catalog.



# EDUCATION

#### Dean

Frederic T. Giles 210 Miller

### Associate Dean

Roger G. Olstad 210 Miller

#### **Assistant Dean**

Homer Boroughs, Jr. 200 Miller

#### Faculty

Affleck, Anderson, Andrews, Baily, Banks, Bashey, Bass, Batie (emeritus), Baxley, Beal, Bill, Bolton, Boroughs, Brammer, Briggs, Broedel, F. Brown, R. Brown, W. Brown, Burgess, Clark, Cope, Corbally (emeritus), 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, Island, Jarolimek, Johnson, Kaltsounis, Kelly, Kerr, Kersh, Kittell, Klockars, Larsen, Lawrence, Lovitt, Lowenbraun, Lumsdaine, MacDonald (emeritus), Madsen, McCartin, Meacham, Monson, Morishima, Neel, Nolen, Olch, Olstad, Ostrander, Peckham, Powers (emeritus), Reitan, Ryckman, Salyer, Sax, Schill, Schneider, Scroggs, Sebesta, Settles, James Smith, John Smith, Stevens, Strayer, Thalberg, Torkelson, Tostberg, Williams.

#### **Faculty From Affiliate Departments and Schools**

Dunnell, Spain (Anthropology); Koenig, Moseley (Art); Miller, Shapiro (Asian Languages and Literature); Halperin, Kruckeberg (Botany); Farner, Olsen (Zoology); Gregory, Ritter (Chemistry); Edmondson, Grummel (Classics); Edelstein, Godfrey (Communications); Crider, Siks (Drama); Parks, Worcester (Economics); Irmscher, Stevick (English); Kakiuchi, Morrill (Geography); Coombs, Whetten (Geology); Galt, Rey (Germanic Languages and Literature); Pressly, Treadgold (History); Granberg, Johnson (Home Economics); Ellison, Legters (Institute for Comparative and Foreign Area Studies); Ahlers, Benne (Librarianship); Cooper, Moore (Music); Fox, Morford (Physical and Health Education); Henley, McDermott (Physics); Flathman, Gottfried (Political Science); Hunt, Lumsdaine (Psychology); Friedrich, Penuelas (Romance Languages and Literature); Augerot, Haney (Slavic Languages and Literature); Burgess, Costner (Sociology); Nilsen (Speech).

The several programs offered by the College of Education in undergraduate and graduate work are designed: (1) to help the prospective teacher to develop competence and sophistication in one or more teaching fields and to develop proficiency in the teaching process through study and practice; (2) to introduce students to the study of education as a basic social institution and to the profession of teaching; (3) through research, observation, and direct experience, to develop the understanding of growth and development in children, youth, and adults; (4) to develop the understanding of teaching and learning processes as they affect the selection, organization, presentation, and evaluation of curriculum materials and resources for various age levels and ability groups; (5) to promote and foster research and advanced study in the several branches of the field of education for which postbaccalaureate work is appropriate; (6) to assist each student in developing a workable philosophy of education and an appreciation of the ethical responsibilities of a professional educator in a free society. An extensive schedule of classroom observation and directed teaching is made available through cooperative arrangement with the public schools in the greater Seattle area.

The College of Education maintains a close liaison with public schools, both in the Seattle area and throughout the state. In cooperation with the State Department of Public Instruction and school districts in all parts of the state, the college carries out the training program for the Standard Certificate.

The College also maintains special programs for observation, research, and practice in the schools of the Seattle area and other districts. The teaching practicum provides every person who seeks a teaching certificate with an opportunity to develop and demonstrate competence by working with master teachers.

# **Bureau of School Service**

Through the Bureau of School Service, the college and the University provide a wide variety of professional services to the schools and communities of the state of Washington.

Robert A. Anderson, Director

# Accreditation

The Teacher Education Program is accredited by the National Council for the Accreditation of Teacher Education. The college also is a member of the University Council for Educational Administration.

#### **College Facilities and Services**

The College of Education Record is published four times a year. In addition to book reviews, education news notes, and occasional college announcements, the journal contains articles on a variety of subjects for teachers and administrators. Bulletins on the graduate degree programs and the training of teachers keep students and educators acquainted with changes in these areas.

# Employment

The Placement Center, 301 Loew, provides assistance

to students and alumni seeking teaching and administrative positions at all levels in public and private educational institutions. Placement files, which are a necessity in educational job seeking, may be established and permanently maintained. Information concerning job openings, writing letters of application, interview procedures, etc., is available. Students should register during the first quarter of their final year. Registration and job-seeking information are free; however, a \$5 fee is charged for creation of a permanent placement file.

### **Student Activities**

Any college student who is preparing to teach may become a member of the Student Education Association by joining the college chapter, Campus meetings are held on a regular schedule. In addition, the association has four regional meetings a year and a state convention in the spring.

Phi Delta Kappa, for men, and Pi Lambda Theta, for women, are national professional organizations for education students. Upper-division and graduate students who maintain high scholarship and show outstanding professional promise may be invited to join one of these organizations.

# UNDERGRADUATE PROGRAMS

Advisory Office 207 Miller

Rufus C. Salyer Director Advisory Services

Jane Watt Assistant to the Director

# Admission to the College of Education

Admission to the College of Education is dependent upon eligibility for admission, enrollment, and registration at the University of Washington.  $\prime$ 

A minimum of 90 approved credits is required of applicants for admission to the College of Education. Admission to the college does not guarantee admission to the Teacher Education Program (see section on "Admission to the Teacher Education Program").

Students transferring from other colleges and schools within the University must already have been admitted to the Teacher Education Program (see section on "Admission to the Teacher Education Program").



# **Bachelor of Arts**

Students working toward the Bachelor of Arts degree in the College of Education must meet certain general requirements of the University and the college as well as the particular requirements of their major and minor departments.

To qualify for the Bachelor of Arts degree, students in the College of Education, in addition to meeting University requirements, must fulfill basic proficiency requirements, a distribution requirement, a major and minor requirement, and a certification requirement.

#### **Basic Proficiencies**

All incoming students whose high school program included three units (years) of college preparatory mathematics, three units (years) of a single foreign language, and four units (years) of English will be considered to have satisfied the basic proficiency requirements. Students who do not satisfy the requirements in this way are required during the first year in residence to complete 15 credits normally selected from the most appropriate courses in English composition, foreign language, or mathematics. Incoming students with 90 or more acceptable transfer credits, and students who have fulfilled the general education requirements of other accredited colleges or universities, will be considered to have satisfied the basic proficiency requirements. Courses taken to satisfy the basic proficiency requirements normally will not be accepted in satisfaction of the distribution requirement.

#### **Distribution Requirement**

For the purposes of general education, a listing of appropriate courses has been divided into three large fields of knowledge: the humanities, the social sciences, and the natural sciences. Each student must select courses to total at least 60 credits, distributed so that no fewer than 20 credits are in any one of the three basic areas. In meeting the distribution requirement, no more than 20 credits of the total shall be taken from any one department.

For courses available, refer to the distribution list at the beginning of the "College of Arts and Sciences" section of this catalog.

#### Major and Minor Requirements

For graduation, the College of Education requires the satisfactory completion of an approved major and, minor. Students electing an elementary school teaching emphasis will complete a minor in elementary education. In certain instances, a major and a minor may be taken in different aspects of the same field, but only where such a procedure is clearly appropriate to preparation for teaching. Major and minor departmental requirements are indicated under "Major and Minor Programs in Education."

# TEACHER CERTIFICATION

Teacher education and certification in the state of Washington are controlled by the State Board of Education. All colleges and universities preparing teachers must conform to the general certification pattern established by the board. The *Provisional Certificate*, the initial teaching certificate, and the *Standard Certificate* are available through the University of Washington.

The Provisional Certificate is a temporary teaching certificate that is valid for a three-year period and is renewable once for an additional three-year period. Completion of 12 approved quarter credits and a minimum of one year of successful teaching are necessary for renewal of the certificate for the second three-year period. For those who have not taught during the first three-year period, the Provisional Certificate may be renewed upon application to the State Department of Public Instruction in Olympia. The certificate will show the subject areas of competence, as well as the level(s) on which the holder is prepared to teach. Beginning teachers are assigned in accordance with their stipulated competencies. Noncitizens should consult with an education adviser concerning State Board of Education regulations relating to the certification of noncitizens.

The Standard Certificate requirements must be completed during the six-year period of the Provisional Certificate. The Standard Certificate is valid as long as the holder teaches and for five years thereafter.

All persons seeking certification at the University of Washington must be admitted to the Teacher Education Program. Requirements for teaching certificates shall be those prescribed by the College of Education at the time the certificate is to be granted.

Information on out-of-state transfers and emergency and special certificates can be obtained from the State Department of Public Instruction in Olympia.

Each of the following certificate patterns provides the student a program that is consonant with the requirements of the State Board of Education. Students who can demonstrate equivalent competence in any of the stipulated areas, as indicated by previous course work or by the successful completion of advanced credit examinations, may petition through the advisory office in the College of Education for appropriate waivers. Courses in professional education completed eleven or more years before admission or readmission are not applicable. Such courses may be re-established by examination.

Field practicums required of all students include introductory classroom observation, participation, and directed classroom teaching. In addition, elective field experiences in classroom teaching and in community service are available. To provide sufficient time for arranging individual practicum assignments, students must pre-enroll in all field experience courses. Complete information about these courses and their application deadlines may be obtained from the Director of Field Experiences, 200 Miller.

Students are urged to participate in a "September Experience" program. Complete information also is available from the Director of Field Experiences, 200 Miller.

# Admission to the Teacher Education Program (Provisional Certification)

Decisions on admission to the Teacher Education Program will be based upon general criteria common to all pre-education students and specific criteria determined by screening committees representing the eight field committees of the College of Education.

# **General Criteria**

Good standing in the University.

Physical and mental health giving promise of success in teaching.

Availability of faculty and physical resources and space in existing teacher education patterns.

### Specific Criteria

These criteria are determined by the following field committees of the College of Education: natural sciences and mathematics, social sciences, foreign languages, language arts, the arts, applied arts, primary education, and upper elementary and middle school.

# **Provisional Certificate**

The College of Education offers six patterns at the elementary school level, leading to the Provisional Certificate. (1) Early Childhood (prekindergarten and primary levels); (2) General (standard) Elementary (kindergarten, primary, intermediate, middle school levels); (3) Communication Disorders; (4) Indian Education; (5) Inner City (Seattle); (6) Special Education. Also offered are elementary specialist programs in art and music. In addition, the general (standard) elementary pattern is available in a field-oriented, three-quarter block in the Northshore, Seattle, and Shoreline school districts. The college also offers at the secondary level one general (standard) pattern, which is available in a field-oriented two-quarter block in the same districts. Complete information is available at the advisory office, 207 Miller, or the Office of Field Experiences, 200 Miller.

The Provisional Certificate is awarded upon demonstration of such general scholarship and such evidence of physical and mental health as give promise of success, and upon completion of (1) a bachelor's degree program; (2) an authorized major; (3) an authorized minor, on elementary level only or, where required, on secondary level; (4) an appropriate professional education sequence; and (5) an approved teaching practicum. Formal admission to any phase of the Teacher Education Program is required.

#### **Professional Education Sequence (A)**

Designed for the General (Standard) Elementary Education Minor, Elementary School Communication Disorders Minor, Elementary School Indian Education Minor, Elementary School or Middle School Inner City Minor, Special Education Minor (Elementary Emphasis).

Admission to any professional course in this sequence requires prior admission to the Teacher Education Program.

Courses	Credits
SPCH 103*	Basic Principles of Oral Communication (5) or
SPCH 203*	Principles of Oral Communication (3) 3 or 5
FDPSY 304	Educational Psychology
CDDGV 209	Evaluation in Education
EDIG 400	A02 Desetioner in Classes Teaching and
EDUC 402 OF	405 Practicum in Classroom Teaching and
	Management: Early Childhood, Kindergarten, Pri-
	mary, or Practicum in Classroom Teaching and
	Management: Intermediate Grades, Middle
	School. Prerequisites, EDPSY 304, EDPSY 308,
	School: Prerequisites, EDPSY 304, EDPSY 308,
	the speech requirement, completion of required
	nortion of the elementary education minor 200
	minimum grade point average in minimum, 2.00
	minimum grade-point average in professional ed-
	ucation, 120 credits, and permission
EDEPS 479	Crucial Issues in Education (graduate students
	should, and, by permission of the instructor post-
•	baccalaureate students may, elect one of the fol-
	lowing: EDEPS 501, 502, 503, 504)
HSTAA 432***	History of Washington and the Pacific
	Northwest
	20.20

\* Students who have completed one or more semesters of speech (principles, theory, and proficiency) in high school may petition for an examination that, if passed, may be substituted for the speech requirement without academic credit. Address all questions to the College of Education advisory office.

\*\* 24 credits for the Inner City Minor.

\*\*\* Required of intermediate grade teachers only. May be taken during the fifth year but must be completed before standard certification.

### DUCATION

### **Professional Education Sequence (B)**

Designed for the Early Childhood Education Minor (prekindergarten and primary grades).

Admission to any professional education course in this sequence requires prior admission to the Teacher Education Program

# TRACK I EMPHASIS: PRE-KINDERGARTEN LEVEL

Courses	Credits	1
SPCH 103*	Basic Principles of Oral Communication (5) or	
SPCH 203*	Principles of Oral Communication (3) 3 or 5	;
EDPSY 304	Educational Psychology	;
EDPSY 308	Evaluation in Education	
EDUC 402	Practicum in Classroom Teaching and Manage	
	ment: Early Childhood, Kindergarten, or Pri-	
	mary (taken concurrently with EDC&I 350, Pro-	
•	gram Planning in Early Childhood Education).	•
	Prerequisites, EDPSY 304, EDPSY 308, the	
	speech requirement, completion of required por-	
	tion of the Early Childhood Education Minor,	
	2.00 mmiinimum grade-point average in profes-	
	sional education, 120 credits, and permission 9	)
EDUC 402	Practicum in Classroom Teaching and Manage-	
	ment: Early Childhood, Kindergarten, or Pri-	
	mary. Prerequisites, EDPSY 304, EDPSY 308,	
	the speech requirement, completion of required	
	portion of the Early Childhood Education	
	Minor, 2.00 minimum grade-point average in	
	professional education, 120 credits and permis-	
	sion	'
EDEPS 479	Crucial Issues in Education (graduate students	
	should, and, by permission of the instructor post-	
	baccalaureate students may, elect one of the fol-	
	lowing: EDEPS 301, 302, 303, 304)	)
	29-34	

#### TRACK II EMPHASIS: PRIMARY LEVEL, K-3

Courses	Credits
SPCH 103*	Basic Principles of Oral Communication (5) or
SPCH 203*	Principles of Oral Communication (3) 3 or 5
EDPSY 304	Educational Psychology
EDPSY 308	Evaluation in Education
EDUC 302	Introductory Practicum in Classroom Teaching
,	Management
EDUC 402	Practicum in Classroom Teaching and Manage-
	ment: Early Childhood, Kindergarten, or Pri-
	mary, Prerequisites, EDPSY 304, EDPSY 308.
	the speech requirement, completion of required
1	portion of the Early Childhood Education Mi-
	por 2.00 minimum grade-point average in pro-
	fessional education 120 credits and permission 18
EDEPS 479	Crucial Issues in Education (graduate students
DDDIG	should and by permission of the instructor post-
	baccalaureate students may elect one of the fol-
	lowing: EDEPS 501, 502, 503, 504)
•	32-37

\* Students having completed one or more semesters of speech (principles, theory, and proficiency) in high school may petition for an examination that, if passed, may be substituted for the speech requirement without academic credit. Address all questions to the College of Education advisory office.

#### PROFESSIONAL MINOR PROGRAMS IN EDUCATION

#### **Early Childhood Education Minor**

(Requirements are 36-50 credits for Track I and 33-47 credits for Track II for Provisional Certificate.)

Courses EDPSY 400		Credits	
	Developmental Foundations of Early	•	
	Learning	3	

EDC&I 347	Modern Theories and Practices in Early
GEOG 100	Introduction to Geography
EDC&I 348	I annuage Arts and Social Studies in Early Edu
EDCar 548	cation. Prerequisites, EDPSY 304 and GEOG
MATH 170	Theory of Arithmetic 3
EDC&I 349	Mathematics and Science in Early Childhood 3
	Education Prerequisites EDPSV 304 and MATH
· · · · · ·	170 In addition a minimum of 5 credits is
	required in a science course to be selected from
	the following list (select one): ATMS 101
	BIOI 101-102 (10 credits) 104. BOT 113 220.
<b>x</b> .	CHEM 100 101: GEOL 101: OCEAN 101:
	PHVS 101_102 110 111. 7001 118
EDC&I 350**	Program Planning in Farly Childhood Education
	Applicable to Track I students only To be
	taken concurrently with EDUC 402. 9 credits.
	Prerequisites, EDPSY 304, EDPSY 308, the
	speech requirement, completion of required por-
	tion of the Elementary Education Minor. 2.00
	minimum grade-point average in professional
	education, 120 credits, and permission 3
EDC&I 360	Reading in the Elementary School, Prerequisite.
	EDPSY 304
EDUC 301	Introductory Practicum in Community Service
+	Activity, Prerequisite, EDPSY 304,
ART 100*	Introduction to Art
EDC&I 342*	Art in the Elementary School, Prerequisites,
	EDPSY 304 and ART 100
MUSIC 119*	Music Fundamentals
EDC&I 346*	Music in Preschool and Primary Grade Class-
	rooms. Prerequisites, EDPSY 304 and MUSIC
	119
EDC&I 321*	Health in the Elementary School. Prerequisite.
	EDPSY 304
EDC&I 324*	Physical Education in the Elementary School.
	Prerequisite, EDPSY 304
	• • • • • • • • • • • • • • • • • • • •

\*Students are normally expected to complete all of the require-ments for the Early Childhood Education minor prior to receiving the Provisional Certificate. One of the starred courses must be included prior to the teaching practicum and for the Provisional Certificate. With the approval of the College of Education advisory Certificate Program).

EDC&I 350\*\* Program Planning in Early Childhood Education (a fifth-year [Standard Certificate] requirement for Track II students).

#### **General Elementary Education Minor**

(Requirements are 30-44 credits for Provisional Certificate.)

Credits
Language Arts in the Elementary School.
Prerequisite, EDPSY 304
Reading in the Elementary School.
Prerequisite, EDPSY 304
Introduction to Geography
Social Studies in the Elementary School, Pre-
requisites, EDPSY 304 and GEOG 100
Science in the Elementary School
Prerequisite EDPSY 304 In addition a mini-
mum of 5 credits is required in a science course
to be selected from the following list (select
one): ATM S 101: BIOL 101-102 (10 credits, or
104: BOT 113, 220: CHEM 100, 101: GEOL 101:
OCEAN 101: PHYS 101 102, 110, 111: ZOOL
118
Theory of Arithmetic 3
Mathematics in the Elementary School, Pre-
requisites EDPSY 304 and MATH 170
Introduction to Art
Art in the Elementary School, Prerequisites,
EDPSY 304 and ART 100
Music Fundamentals
Music in the Elementary School. Intermediate
Grades (3) or

EDC&I 346*	Music in Preschool and Primary Grade Class- rooms (3). Prerequisites, EDPSY 304 and
	MUSIC 119
EDC&I 321*	Health in the Elementary School. Prerequisite, EDPSY 304
EDC&I 324*	Physical Education in the Elementary School. Prerequisite, EDPSY 304

\* Students are normally expected to complete all of the requirements for the Elementary Education Minor prior to provisional certification. One of the starred courses must be included prior to the teaching practicum and for the Provisional Certificate. With the approval of the College of Education advisory office, the others may be deferred until the fifth year (Standard Certificate Program).

**Elementary School Communication Disorders Minor** 

(Requirements are 30 credits for Provisional Certificate.)

Courses	Credits
EDC&I 360	Reading in the Elementary School. Prerequisite, EDPSY 304
EDC&I 320	Organization of School Programs in Communi- cation Disorders. Prerequisites, EDPSY 304, and SPCH 351 or 391
EDPSY 401	Advanced Educational Psychology—Learning. Prerequisite. EDPSY 304
SPCH 432	Interview Techniques for Communication Dis- orders. Prerequisites, SPCH 250 and junior
•	standing
	11

In addition, 19 approved credits must be elected from the following:

Courses	Credits
DRAMA 338	Creative Dramatics
EDC&I 347	Modern Theories and Practices in Early Child-
1	hood Education. Prerequisite, EDUC 228 3
EDC&I 355	Language Arts in the Elementary School. Pre-
	requisite, EDPSY 304
EDPSY 400	Developmental Foundations of Early Learning.
	Prerequisite, EDPSY 304
EDPSY 402	Childhood Socialization and School Practice. Pre-
	requisites, EDPSY 304 and 401 3
EDPSY 447	Principles of Guidance
EDSPE 403	Education of the Emotionally Disturbed 3
EDSPE 404	Exceptional Children
EDSPE 405	Educating the Mentally Retarded
EDSPE 409	Mental Retardation
EDSPE 411	Learning Disabilities
EDSPE 414	Education of the Exceptional Individual in the
	Inner City
EDSPE 416	Evaluation of Instructional Material for Excep-
	tional Children
EDSPE 418	Vocational Development of Handicapped Chil-
1 11 1 0 000	dren and Youth
LING 200	Introduction to Linguistics
	or
LING 400	Survey of Linguistic Method and Theory 3
PSICH 305	Deviant Personality. Prerequisites, PSYCH 100
DOVCIT 10C	or 190 and 10 credits in psychology
P31CH 300	Developmental Psychology. Prerequisite, PSYCH
DEVOU 220	Field Applying of the Debautor of Young Obt
F31CH 320	drep Prerequisite EDBSY 204 or DSYCH 206 2
PSYCH 410	Deviant Development Prorequisites DEVCH
101011410	305, 306
SPCH 455	Communication in Children's Environments Pre-
	requisites, junior standing and EDUC 288 4
SPCH 451	Speech Pathology—Audiology Practicum in the
	Schools, Prerequisites, SPCH 350 and permission
	1-2

#### Elementary School Indian Education Minor

(Requirements are 44 credits for Provisional Certificate.)

Courses		1. C		Credits	
EDUC 302	Introductory	Practicum	in	Classroom Teaching	
•	and Manager	ent		· · · · · · · · · · · · · · · 3	

EDC&I 360	Reading in the Elementary School
EDC&I 355	Language Arts in the Elementary School 3
•	(LING 455 may be substituted for EDC&I 355). 3
EDC&I 370	Science in the Elementary School
	Prerequisite, 5 approved credits in science 5
MATH 170	Theory of Arithmetic
EDC&I 375	Mathematics in the Elementary School. Prereq-
	uisite, MATH 170
GEOG 100	Introduction to Geography
EDC&I 365	Social Studies in the Elementary School. Pre-
	requisite, GEOG 100
EDC&I 321	Health in the Elementary School
EDC&I 464	The Indian Child and His Education 5
EDPSÝ 447	Principles of Guidance
	-

**Elementary School or Middle School Inner City Minor** 

(Requirements are 24 credits for Provisional Certificate.)

Duration: Three consecutive quarters, excluding Summer Quarter. Prerequisite, 2.50 minimum grade-point average; 90 credits. Must have completed MATH 170, ART 100, or MUSIC 119, SPCH 103 or 203, GEOG 100, 5 approved credits in science. Selection based upon personal qualities and commitment to "inner city" teaching. Selection for the program admits the student to the Teacher Education Program. Enrollment limited to ten students per quarter.

Courses		Credit	s
EDC&I 355	Language Arts in the Elementary School .		3.
EDC&I 360	Reading in the Elementary School		3
EDC&I 375	Mathematics in the Elementary School		3
Special Methods	· · · · · · · · · · · · · · · · · · ·		6
Socioethnic Edu	cation (courses will be recommended to the	ne in-	-
	tern) (3,3,3)		9

Special Education Minor: Undergraduate (Elementary Emphasis)

30 credits required. Admission based upon selection by the Special Education Area faculty. Prerequisites, GEOG 100, 5 approved credits in science.

Courses	Credits
EDC&I 355	Language Arts in the Elementary School 3
EDC&I 360	Reading in the Elementary School
EDC&I 365	Social Studies in the Elementary School 3
EDC&I 370	Science in the Elementary School
EDC&I 375	Mathematics in the Elementary School 3
MATH 170	Theory of Arithmetic
EDSPE 404	Exceptional Children
EDSPE 403	Educating of the Emotionally Disturbed or
EDSPE 409	Mental Retardation or
EDSPE 411	Learning Disabilities
EDSPE 412	Behavioral Measurement and Management in the
	Classroom
EDSPE 499	Undergraduate Research

Students are urged to give serious consideration to including the following courses in the Standard Certificate Program:

Courses	Credits
EDC&I 321	Health in the Elementary School or
EDC&I 324	Physical Education in the Elementary School 3
ART 100	Introduction to Art
EDC&I 342	Art in the Elementary School
MUSIC 119	Music Fundamentals
EDC&I 343	Music in the Elementary School, Intermediate

# Special Education Minor: Undergraduate (Secondary Emphasis)

30 credits required. Admission based upon selection by the Special Education Area faculty. Prerequisites, GEOG 100, 5 approved credits in science.

Courses	Credits
EDSPE 404	Exceptional Children
EDSPE 418	Vocational Development of Handicapped Children and Youth
EDSPE 403	Educating the Emotionally Disturbed or
EDSPE 409	Mental Retardation or
EDSPE 411	Learning Disabilities
EDSPE 412	Behavioral Measurement and Management in the
	Classroom
EDSPE 499	Undergraduate Research
EDC&I 462	Reading in the Secondary School
<b>Electives</b> consist	ent with vocational goals as approved by
Special Educati	on faculty adviser
	$\sim$

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# Elementary School Specialist: Art

#### **Elementary School Specialist: Music**

The programs leading to the Provisional Certificate in these specializations will be found under "Art" and "Music" in the section following, "Major and Minor Programs in Education."

### **Provisional Certificate (Secondary Emphasis)**

Admission to any professional education course in this sequence requires prior admission to the Teacher Education Program.

Courses	Credits
SPCH 203*	Principles of Oral Communication (3) or
SPCH 103* EDPSY 304 EDPSY 308 EDC&I**	Basic Principles of Oral Communication (5) 3 or 5 Educational Psychology
EDUC 404	Practicum in Classroom Teaching and Manage- ment: Secondary School. Prerequisite, the speech requirement, EDPSY 304, EDPSY 308, Special Methods, 120 credits, 2.00 minimum grade-point average in professional education, and permission. Students enrolling in student Teaching Practicum with majors in a social studies field must have completed course work in geography, economics, world history, United States history, and Wash- ington State history prior to the teaching practi-
EDEPS 479	Crucial Issues in Education (graduate students should, and, by permission of the instructor postbaccalaureate students may, elect one of the following: EDEPS 501, 502, 503, 504) 3 35-43

\* Students who have completed one or more semesters of speech (principles, theory, and proficiency) in high school may petition for an examination that, if passed, may be substituted for the speech requirement without academic credit. Address all questions to the College of Education advisory office.

\*\* For most secondary teaching fields, one or more special methods courses are required. For specific information, contact the advisory office, 207 Miller. Students are reminded that this is a professional requirement not usually shown within the major course listing.

# MAJOR AND MINOR PROGRAMS IN EDUCATION

Listed below are the major and minor academic fields for elementary and secondary teachers. It is the responsibility of the student to consult the selected department to verify requirements and to obtain course approval where requested.

American Indian Studies Teaching Major: Secondary School Emphasis 65 approved credits required.

INDIAN STUDIES BASIC CORE (30 CREDITS) ANTH 311, 333, 334, 335, 416; ART 115; PHY A 284; GIS 245, 313, 317, 338, 340; EDC&I 464.

### 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; GEOG 342; GIS 222, 223, 224, 310, 340; PHY A 285; POL S 211; PSYCH 250, 443; SOC 362.

#### Anthropology

# Teaching Major: Secondary or Elementary School Emphasis

To be admitted as a major in anthropology in the College of Education, each student must have completed: all College of Education proficiency requirements; a minimum of 90 credits; and two of the following three courses, with a minimum grade of B in one of them: PHY A 201, ANTH 202, or ARCHY 205.

To graduate with a Bachelor of Arts degree in this curriculum from the College of Education, a student must have completed: 50 credits selected from both upperand lower-division courses in the Department of Anthropology, including PHY A 201, ANTH 202, and ARCHY 205; and a minimum of 25 credits of the required 50 with a grade of B or above (courses in which a student receives a D or E may not be counted toward the required 50 credits for the major).

#### Teaching Minor: Secondary School Emphasis

All entrance and graduation requirements noted above for the student majoring in anthropology apply to the student who is minoring in anthropology, except that 30 credits in courses at the 200 level or above are required, and that a minimum of 15 credits must show a grade of B or higher.

#### Art

Teaching Major: Secondary School Emphasis; Elementary School Specialization; Elementary and Secondary School Specialization (K-12)

70 approved credits required. Courses: ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203; ART 210, 211, 212; 3 credits from ART 250, 253, 254, 255; 256, 259; 305 or 201; 3 credits from ART 300, 301, 302, 303, 304; 3 credits from ART 272, 350, 358; 14 credits of approved art electives; EDC&I 340 (options 1, 2, and 3), EDC&I 341 (options 1 and 3).

#### Teaching Major: Elementary School Emphasis

50 approved art credits required. Courses: ART 105, 106, 107, 109, 110, 129; ART H 201, 6 credits of approved art history electives; ART.250 or 255; 9 credits from ART 300, 302, 303, 304, 305; 9 credits of approved art electives; EDC&I 342.

### **Teaching Minor: Secondary School Emphasis**

15 approved art credits required. Offered only in combination with art major.

### **Asian American Studies**

**Teaching Major: Secondary School Emphasis** 

62–71 approved credits required.

#### TRACK A: SOCIAL STUDIES

Courses: HSTAA 201, 432; HST 113; GEOG 100, 313; ECON 200; POL S 210; GIS 305; EASIA 210; PSYCH 448.

Plus a minimum of 14–22 approved credits from the following list of Asian American core courses. Before taking any of the core courses, the student must have his or her Program of Studies approved by the Asian American Studies adviser in the College of Education. Courses: GIS 410, 411, 360, 443; G ST 391; PSYCH 250; EDUC 301, 401; ART H 301; C LIT 302; HSTAS 422, 470, 453, 423, 454.

#### Biology

#### **Teaching Major: Secondary School Emphasis**

47-54 approved credits required. Courses: BIOL 101-102; BOT 220, 113 or BIOL 210, 211, 212; CHEM 102 or 231, 232, 241; GENET 451; MICRO 301, 302; and four out of the five following categories (three must have laboratories): BOT 371 or 472; ZOOL 208 or 301; ZOOL 362 or 456; ZOOL 330 or 331; ZOOL 409 or BIOL 472.

#### Teaching Major: Elementary School Emphasis

45-50 approved credits required. Courses: BIOL 101-102; BOT 220, 113; or BIOL 210, 211, 212; CHEM 102 or 231, 232, 241; 25 credits of upperdivision courses (must include 5 credits in botany and 10 credits in zoology). (Also see natural sciences teaching major.)

#### Teaching Minor: Secondary School Emphasis

30 approved credits required. Courses: approved electives in biology, botany, and zoology and at least one 5-credit course in upper-division biological sciences.

#### Black Studies

Teaching Major: Secondary School Emphasis

62-65 approved credits required.

#### TRACK A: SOCIAL STUDIES

Courses: SOC S 150; HSTAA 201, 432; HST 113; GEOG 100; ECON 200; HST 495; POL S 210; SOC 105; plus 25 approved credits from the following Black Studies core courses: ANTH 111, 212; PHY A 281, 282; GEOG 227; HST 361, 362, 421; HSTAA 443, 444; PSYCH 250, 260, 443; SOC 362, 463; ENGL 358.

#### TRACK B: LANGUAGE ARTS

Courses: ENGL 358, 444, 212\*, 271, 277, 391 or 393, 351 or 352 or 353; SOC S 150. In addition, 30 approved credits from the following Black Studies core courses: DRAMA 490; C LIT 261, 262, 263; ENGL 251\*, 211\*, 355\*, 399\*; SPCH 100, 140, 329.

\* Sections in which Black literature is given special emphasis. Consult with an adviser regarding appropriate selection of sections.

### **Teaching Major: Elementary School Emphasis**

62-64 approved credits required. Courses: the same courses as for "Teaching Major: Secondary School Emphasis," Track A or Track B.

### Teaching Minor: Secondary School Emphasis

35 approved credits required. Courses: 35 approved credits from Track A or Track B required.

# **Business Education**

## Teaching Major: Secondary School Emphasis

54 approved credits required. Courses: ACCTG 210, 220; Q METH 200; BG&S 101, 200; ECON 200, 201; MKTG 300 or 301; B CMU 301; A ORG 460; BG&S 361 or B ECON 301 or MKTG 381 (may be deferred until fifth year); EDC&I 314, 315, 316.

### **Teaching Major: Elementary School Emphasis**

37 approved credits required. Courses: ACCTG 210, 220; Q METH 200; BG&S 101, 200; ECON 200; A ORG 460 or ECON 201; B CMU 301; EDC&I 314.

#### **Teaching Minor: Secondary School Emphasis**

35 approved credits required. Courses: ACCTG 210, 220; BG&S 101, 200; ECON 200; B CMU 301; approved elective in business or economics (3 credits); EDC&I 314; 315 or 316.



# Chemistry .

A grade of C or higher must be obtained in each required chemistry course or approved equivalent.

## Teaching Major: Secondary or Elementary School Emphasis

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).

\* CHEM 350 may be substituted for CHEM 232, and CHEM 351 may be substituted for CHEM 241.

# Chinese

### **Teaching Minor: Secondary School Emphasis**

37 approved credits required. Also required is a proficiency in oral and written Chinese and training in teaching methods of Chinese. Proficiency in the language must be demonstrated by examination. Courses: CHIN 311, 312, 313, 441, 442, 443; methods course in Chinese language; and 10 credits from the following courses: CHIN 362; GEOG 336; ECON 493; HSTAS 454; PHIL 414; POL S 414 or 442.

#### **Classical Studies**

#### **Teaching Major: Elementary School Emphasis**

64-66 approved credits required. Courses: GRK 101, 102, 103, 201, 202, 203, 207, 208; or LAT 101, 102, 103, 201, 202, 203, 206, 207, 208; plus 36 credits chosen with the approval of the department from courses in upper-division Greek, upper-division Latin, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science. CLAS 101 and HST 111 are not acceptable.

# Comparative and Foreign Area Studies, Institute for Teaching Major: Secondary School Emphasis

45 approved credits required. Courses: as listed under "Comparative and Foreign Area Studies" in the "College of Arts and Sciences" section of this catalog. Students shall meet all the requirements of the regional program elected with the exception of the language requirement; however, all students are urged to meet the language requirement, particularly students intending to continue in graduate programs. (For the Latin American Studies major, the language requirement is compulsory.)

## Teaching Minor: Secondary School Emphasis

30 approved credits required. Courses: as listed under

"Foreign and Comparative Area Studies" in the "College of Arts and Sciences" section of this catalog. Students shall complete 30 credits of approved courses within the regional program elected. Credits must include all specified program requirements with the exception of the language requirement.

Certification students may make elections from the following institute regional studies programs: China, Japan, Korea, South Asia, Russia, East Europe, and Latin America, Africa, and Near East Studies.

The program elected should be pursued only after consultation with the appropriate program undergraduate adviser.

## **Comparative Literature**

#### **Teaching Major: Secondary School Emphasis**

45–55 approved credits required.\* Courses: C LIT 300, 301, 302; CLAS 210 or any upper-division course in Latin or Greek literature; at least two additional upper-division courses in comparative literature; at least one course in a literature other than English, studied in the original language; EDC&I 356 or 331 or 336 or 338 or 334 or 335 or 339.

# **Teaching Major: Elementary School Emphasis**

45–55 approved credits required.\* Courses: C LIT 300, 301, 302; CLAS 210 or any upper-division course in Latin or Greek literature; at least two additional upper-division courses in comparative literature; at least one course in a literature other than English, studied in the original language; LIBR 451 or 453; EDC&I 330 or 336 or 338 or 333 or 339.

#### **Teaching Minor: Secondary School Emphasis**

32-40 approved credits required.\* Courses: C LIT 300, 301, 302; CLAS 210 or any upper-division course in Latin or Greek literature; at least one course in a literature other than English, studied in the original language; EDC&I 356 or 331 or 332 or 336 or 338 or 334 or 335 or 339.

\* Ordinarily, only 300- and 400-level literature courses may be applied toward the degree.

# Drama

#### **Teaching Major: Secondary School Emphasis**

45 or 51 approved credits required. Courses: DRAMA 210, 211, 212 or 325, and either 210 or 212; 151, 152, 153 or 251, 252, 253 with DRDNC 101, 102, 103; DRAMA 316, 274, and one of 374, 375, 376, 377, 378, 379, 472, 473; 475, 476, 477, 478, 479; 460, 461, 462, 463.

# Teaching Major: Elementary School Emphasis

45 approved credits required. Courses: DRAMA 151, 152 or 251, 252 with DRDNC 101, 102; DRAMA 230, 316; 325 or 210, 211, 212; 331, 336, 338, 436, 438 plus approved drama electives to bring total to required number of credits.

#### Teaching Minor: Secondary School Emphasis

28 approved credits required. Courses: DRAMA 274, 230, 316, 326; 146, 151, 152 or 251, 252, 253 with DRDNC 101, 102, 103; DRAMA 325 or 210, 211, 212.

# **Earth Science**

# GEOLOGICAL SCIENCES EMPHASIS

Administered by the Department of Geological Sciences.

#### **Teaching Major: Secondary School Emphasis**

63 approved credits required. Courses: GEOL 205, 301, 320, 321, 361; CHEM 140, 150, 160; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; ATM S 101 or 201; ASTR 101 or 301; OCEAN 101 or 203.

# **OCEANOGRAPHY EMPHASIS**

Administered by the Department of Oceanography.

#### **Teaching Major: Secondary School Emphasis**

60 approved credits required. Courses: OCEAN 401, 402, 403, 406, 421; MATH 124, 125, 126; CHEM 140, 150, 151, 160; PHYS 121, 122, 123, 131, 132, 133; ASTR 101 or 301; ATM S 101 or 201; GEOL 101 or 205.

#### ASTRONOMY EMPHASIS

Administered by the Department of Astronomy.

# Teaching Major: Secondary School Emphasis

60 approved credits required. Courses: 15 approved credits in astronomy; MATH 124, 125, 126; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; ATM S 101 or 201; GEOL 101 or 205; OCEAN 101 or 203.

# ATMOSPHERIC SCIENCES EMPHASIS

Administered by the Department of Atmospheric Sciences.

Courses: ATM S 101 or 201, 321, 351; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; ASTR 101 or 301; GEOL 101 or 205; OCEAN 101 or 203; 10 to 14 elective credits in astronomy, atmospheric sciences, chemistry, geological sciences, mathematics, or oceanography.

# GENERAL EMPHASIS

Administered by the College of Education.

# **Teaching Major: Secondary School Emphasis**

60 approved credits required. Courses: ASTR 101 or 301; ATM S 101 or 201; GEOL 101 or 205, 103; OCEAN 101 or 203; elective in one of the above departments, 5 credits; BIOL 101–102 or 210, 211, 212 or equivalent; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; CHEM 101, 102 or 140, 150, 151, 160.

#### **Teaching Minor: Secondary School Emphasis**

Administered by the Department of Geological Sciences.

25 approved credits required. This program is available only to students with a teaching major in a science field. Courses in each of the earth science departments (Astronomy, Atmospheric Sciences, Geological Sciences, and Oceanography).

# Economics

# **Teaching Major: Secondary School Emphasis**

57-60 approved credits required. Courses: ECON 200, 201, 300, 301, 281; four electives in economics chosen from a minimum of three fields of specialization other than theory (20 credits); MATH 157 or 124; two courses to be chosen from the following list: MATH 125, 126, 305, PHIL 120, 370, 470, ACCTG 210; and additional upper-division economics courses.

#### **Economics Major: Elementary School Emphasis**

44 or 45 approved credits required. Courses: ECON 200, 201, 281, 300, 301; three electives in economics chosen from a minimum of two different fields of specialization (15 credits); MATH 157 or 124.

#### **Teaching Minor: Secondary School Emphasis**

35 approved credits required. Courses: ECON 200, 201, 300, 301; three electives in economics chosen from a minimum of two different fields of specialization, or ECON 281 and two electives in economics chosen from two fields of specialization (15 credits).

### English

# **Teaching Major: Secondary School Emphasis**

54-58 approved credits required. Courses: ENGL 271 or 272; 5 additional credits in advanced writing or ENGL 441 or 444\*; ENGL 391, 392 or 393 or 442 or 444\*; ENGL 211 or 5 credits in fiction, ENGL 212 or 5 credits in poetry, ENGL 213 or 411 or 412; 5 credits from ENGL 221, 222, 223, 231, 241, 251, 261, or 413, 414, 415, 416; 5 credits from ENGL 351 through



358, 395, or 397; 5 credits from ENGL 311, 314, 315, 322, or 396; 5 credits from ENGL 371, 372, 375, 376, 417, 444\* or LIBR 451 or 453; HSS 480 or 5 credits of literature in translation (e.g., CLAS 430); EDC&I 356.

#### **Teaching Minor: Secondary School Emphasis**

36–38 approved credits required. Courses: ENGL 271 or 272; 5 additional credits in advanced writing or ENGL 441 or 444\*; ENGL 391 or 392 or 393 or 442; ENGL 211 or 5 credits in fiction, ENGL 212 or 5 credits in poetry, ENGL 213 or 5 credits in drama; 5 elective credits in literature; 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, 392 or 393 or 442 or 444\*. ENGL 211 or 5 credits in fiction, ENGL 212 or 5 credits in poetry, ENGL 213 or 5 credits in drama; 10 additional credits from any two of the following four groupings: group 1—ENGL 221, 222, 223, 231, 241, 251, 261, or 413, 414, 415, 416; group 2—ENGL 351 through 358, 395, or 397; group 3—ENGL 311, 314, 315, 322, or 396; group 4—ENGL 371, 372, 375, 376, 417, 444\* or LIBR 451 or 453, HSS 480, or 5 credits of literature in translation (e.g., CLAS 430).

\* Variable topics in ENGL 444 in writing, language, and literature.

# French (Romance Languages and Literature)

# Teaching Major: Secondary School Emphasis

.51 approved credits beyond FREN 222 required, as are a proficiency in oral and written French, knowledge of French literature and culture, and training in the application of modern principles, materials, and methods of foreign-language teaching. Satisfaction of the requirements is to be certified by the adviser in the Department of Romance Languages and Literature before the student begins teaching practicum (EDUC 403 or 404). The Program of Study, supervised by the departmental adviser, normally should include the following courses: FREN 301, 302, 303, 304, 305, 306, 350, 351, 352, 409; 403 or ROM 401; 9 credits of approved literature and/or civilization courses at the 400 level, including at least 6 in literature; EDC&I 329; 330, 331 or 332.

Credit may be arranged for study abroad, preferably during the junior year, subject to the regulations governing transfer credit and provided the student's plan is approved in advance by the departments in which he is studying.

# Teaching Major: Elementary School Emphasis

42 approved credits required. Courses: same as for "Teaching Major: Secondary School Emphasis" with one exception: the 9 credits of literature and/or civilization are not required.

# **Teaching Minor: Secondary School Emphasis**

42 approved credits required. Courses: same as for "Teaching Major: Elementary School Emphasis."

## Geography

# **Teaching Major: Secondary School Emphasis**

50 approved credits required. Courses: GEOG 100, 205, 200 or 207, 258, 235 or 277, 315 or 342 or 350 or 303 or 370, 302 or 402; one systematic and two regional geography upper-division elective courses approved by geography adviser (15 credits).

# **Teaching 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."

#### **Teaching Major: Elementary School Emphasis**

54 approved credits required. 10 credits of electives may be taken during the fifth year. Courses: CHEM 140, 150, 151, 160; BIOL 101–102; GEOL 101 or 205, 103 or 361, 320, 430; 10 credits of approved upper-division geological sciences electives or approved courses in related fields.

# German (Germanic Languages and Literature)

Grade-point average of 2.50 must be maintained in all German courses in the programs.

# Teaching Major: Secondary School Emphasis

55 approved credits above the second-year level required. The following courses fulfill 43 credits; the remainder of the required 55 credits may be chosen from other upper-division courses offered by the department. Courses: GERM 301, 302, 303, 310, 311, 312, 401, 402, 403, 405, 413, 414; EDC&I 336.

#### Teaching Major: Elementary School Emphasis

24 approved credits above the second-year level required. Courses: GERM 301, 302, 303, 310, 311, 312, 405; EDC&I 337.

#### Teaching Minor: Secondary School Emphasis

30 approved credits above the second-year level required. Courses: GERM 301, 302, 303, 310, 311, 312, 401, 402, 403; EDC&I 336.

#### **Health Education**

#### Teaching Major: Secondary School Emphasis

40 approved credits in core and area courses and 22–25 credits in foundation courses required. Core requirements: H ED 250, 292, 350, 352, 353. Area requirements: one course from each of the following groups: group A—H EC 300, 409; group B—PC EH 411, PC EP 420, PC HS 323, 424; group C—EDPSY 408, PBSCI 451, PSYCH 305. Two courses from the following: group D—H ED 481, H EC 356, PSYCH 250, 260, 403, SOC 240, 330, 331, 352, 362, 365, 452, 453, SPCH 472. Foundation requirements: B STR 301; MICRO 101, 301; PSYCH 100; SOC 110; ZOOL 118, 119, 208.

#### **Teaching Major: Elementary School Emphasis**

45 approved credits required. Courses: elementary school emphasis is established with the guidance of the health education adviser.

#### **Teaching Minor: Secondary School Emphasis**

25 30 approved credits in core and area courses and 15 credits in foundation courses required. Core requirements: same as for "Teaching Major: Secondary School Emphasis." Area requirements: one course from each of the following groups: group A—H EC 300, 409; group B—EDPSY 408, PSYCH 451, 305; group C—PC HS 323, 424. Foundation requirements: human biology or human physiology; PSYCH 100; SOC 110.

### **History Education**

#### **Teaching Major: Secondary School Emphasis**

53 approved credits required. 2.50 grade-point average required in history courses taken at the University of Washington. Courses; HST 111 or HSTAM 201 or 202, HST 112, 113; HSTAA 432, three upper-division United States history courses, one upper-division modern Europe course; EDC&I 366; and two electives.

### **Teaching Major: Elementary School Emphasis**

53 approved credits required. Courses: same as for "Teaching Major: Secondary School Emphasis," except that an elective may be substituted for the upper-division modern Europe course.

#### **Teaching Minor: Secondary School Emphasis**

33 approved credits required. 2.50 grade-point average required in history courses taken at the University of Washington. Courses: HST 111 or HSTAM 201 or 202, HST 112, 113; HSTAA 201, 432; EDC&I 366; and one elective.

On occasion, equivalent courses may be substituted for the numbered courses if the permission of the Department of History is obtained.

# **Home Economics Education**

#### **Teaching Major and Minor: Secondary School Emphasis**

71 approved credits required in home economics courses and education courses, and 38 credits required in prerequisite courses. Home economics courses: H C 125, 134, 148, 307, 314, 347, 348, 354, 356, either 456 or 483, 457 and eleven electives. Education courses: EDUC 301 or equivalent, 302, and 401; EDC&I 327 and 404. Prerequisite courses: ART 109 or 129, CHEM 101 and 102 or equivalents, ECON 200, MICRO 101 or 301 or 302, PSYCH 100 and 306, and ZOOL 118 or equivalent.

#### **Teaching Major: Elementary School Emphasis**

45 approved credits required in home economics courses and 23 credits required in prerequisite courses. Home economics courses: H EC 125, 134, 148, either 300 or 307, 314, 347, 354, 356, 457 and eight to eleven electives. Prerequisite courses: ART 109 or 129, CHEM 101 and 102 or equivalents, ECON 200, ZOOL 118 or equivalent.

#### **Teaching Minor: Secondary School Emphasis**

34 approved credits required in home economics courses and 23 credits required in prerequisite courses. Home economics courses: HEC 125, 134, 148, 307, 314, 347, 354, and 356. Prerequisite courses: ART 109 or 129, CHEM 101 and 102 or equivalents, ECON 200, ZOOOL 118 or equivalent.

#### **Industrial Education**

#### **Teaching Major: Secondary School Emphasis**

57 approved credits required. Courses: EDC&I 300, 301, 302, 303, 304 305, 306, 307, 309, 400, 401; M E 301, 302, 303, 312; H ED 292 or approved substitute; fourteen approved electives.

#### **Teaching Major: Elementary School Emphasis**

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; H ED 292 or approved substitute; four approved electives.

# Japanese

#### **Teaching Minor: Secondary School Emphasis**

37 approved credits required, as are a proficiency in oral and written Japanese and training in teaching methods of Japanese. Proficiency in the language must be demonstrated by examination. Courses: JAPAN 311, 312, 313 or 333; 411, 412, 413. Electives: HSTAS 213; GEOG 437; POL S 435; HSTAS 423; JAPAN 441, 421.

# Journalism

#### **Teaching Major: Secondary School Emphasis**

47 50 approved credits required. Courses: CMU 150, 200, 320, 321, 324, 406, 414, 480 or 481; EDC&I 358 or 458; and 6 9 credits taken from the following electives: CMU 220, 291, 314, 325, 353, 400, 402, 411, 443, 450, 474, 480, 481, 483; SOC 443.

#### Journalism Major: Elementary School Emphasis

47 50 approved credits required. Courses: same as for "Teaching Major: Secondary School Emphasis."

#### **Teaching Minor: Secondary School Emphasis**

27 approved credits required. Courses: CMU 150, 200, 321; EDC&I 358; and at least 10 credits from the following electives: CMU 400, 402, 406, 411, 414, 443, 450, 474, 480, 481, 483.

#### Latin (Classics)

#### Teaching Major: Secondary School Emphasis

36 approved credits required. Courses: 27 credits in upper-division Latin courses, and 9 credits chosen with the approval of the Department of Classics from courses in Greek, upper-division Latin, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science.

#### **Teaching Major: Elementary School Emphasis**

36 approved credits required. Courses: same as for "Teaching Major: Secondary School Emphasis."

#### **Teaching Minor: Secondary School Emphasis**

18 approved credits required. Courses: any approved upper-division Latin courses.

#### Librarianship

#### Teaching Minor: Secondary School Emphasis

24 approved credits required. Courses: LIBR 440, 441, 442, 443, 453, 454; EDC&I 480, 481.

# **Teaching Minor: Elementary School Emphasis**

24 approved credits required. Courses: LIBR 440, 441, 442, 443, 451, 454; EDC&I 480, 481.

Elementary and secondary school librarians must have preparation according to *Programs for the Learning Resources Center; Standards for Integrating School Library and Media Services,* approved by the State Board of Education.

·	Elementary	Secondary
Minimum	18 credits	24 credits
Good	24 credits	36 credits
Excellent	Master's degree	Master's degree

Every applicant for a school library position must hold a teaching certificate for the appropriate level and must meet the standards recommended to the State Board of Education.

Courses listed above meet (1) recommendations for elementary, junior high, and senior high school librarians in compliance with the *Standards of 1968*, and/or (2) requirements for the librarianship teaching minor: secondary or elementary school emphasis, undergraduate teacher preparation.

A class entry card must be obtained in 133 Suzzallo.

#### **Mathematics**

# **Teaching Major: Secondary School Emphasis**

45 approved credits required beyond Elementary Functions.\* Courses: MATH 114, 124, 125, 126, 205 or 302, 327, 391, 392, 411, 412, 444, 445 and 3 credits in approved mathematics electives.

#### **Teaching Major: Elementary School Emphasis**

36 approved credits required beyond Elementary Functions.\* Courses: MATH 124, 125, 126, 170, 171, 205 or 302, 411, 412 and two courses from 106, 301, or 305.

#### **Teaching Minor: Secondary School Emphasis**

30 approved credits required beyond Elementary Functions.\* Courses: MATH 124, 125, 126, 205, 411, 412, 444, 445.

\* The student must obtain grades of C or higher in all mathematics courses offered to satisfy the requirement and a grade-point average of at least 2.00 in all mathematics courses taken. EDC&I 378 is required for both the teaching major and minor with secondary school emphasis.

# **Music Education**

Teaching Major and Minor: Music Specialist 96 or 97 approved credits required.

# INSTRUMENTAL AND CHORAL PERFORMANCE EMPHASIS

Courses: MUSIC 110, 111, 112, 113, 114, 115, 210, 211, 212, 213, 214, 215, 313, 314, 340 (prerequisite, EDUC 302 [music section] and admission to Teacher Education Program); MUSIC 310 or 311 or 490; 280, 380, 381, 382; 442 or 443; 432 or 440 or 441 or 442 or 443; major instrument or voice (21–24 credits); minor instrument or voice (9–12 credits); major and minor instrument or voice to total 33 credits; ensemble (12 credits, minimum of one year choral ensemble required).

# SECONDARY GENERAL MUSIC EMPHASIS

Courses: MUSIC, 110, 111, 112, 113, 114, 115, 210, 211, 212, 213, 214, 215, 313, 314, 340 (prerequisite, EDUC 302 [music section] and admission to Teacher Education Program); MUSIC 316 or 317 or 318; 432; 440 or 441 or 442 or 443; 280; 380; major instrument or voice (15–24 credits); minor instrument or voice (9–18 credits); the combined number of credits in major and minor instruments or voice must total 33 and must include the equivalent of MUSIC 236, 237, 232, 240, 241; ensemble (12 credits, minimum of one year choral ensemble required).

# ELEMENTARY-GENERAL MUSIC EMPHASIS

Courses: MUSIC 110, 111, 112, 113, 114, 115, 210, 211, 212, 213, 214, 215, 313, 314, 340 (prerequisite, EDUC 302 [music section] and admission to Teacher Education Program); MUSIC 316 or 317 or 318; 440, 441, 180, 280, 380; major instrument or voice (15–24 credits); minor instrument or voice (9–18 credits); the combined number of credits in major and minor instruments or voice must total 33 and must include the equivalent of MUSIC 236, 237, 232, 240, 241; ensemble (12 credits, minimum of one year choral ensemble required).

### **Music Major: General Elementary School Emphasis**

50 approved credits required. Courses: MUSIC 110, 111, 112, 113, 114, 115, 213, 214, 215, 330; EDC&I 343 or 346; music applied (18 credits to include not less than 3 credits in voice and 3 credits in pjano); ensemble (6 credits).

### **Natural Sciences**

### **Teaching Major: Elementary School Emphasis**

65–72 approved credits required. The natural sciences major for elementary school emphasis students is offered jointly by the departments of Botany, Chemistry, Geological Sciences, Physics, and Zoology. Approval of the major may be obtained by the student from one of the following: Chemistry advisory office, Geological Sciences advisory office, Physics advisory office, or Biology teacher preparation office. The office giving original authorization shall continue to supervise until the approved program is completed.

Courses: CHEM 101, 102 or 140, 150, 151, 160, 170; PHYS 101, 102, 103, or 114, 115, 116, 117, 118, 119, or 121, 122, 123, 131, 132, 133; BIOL 101-.102; BOT 220; ZOOL 118 or 208 or BIOL 210, 211, 212; BOT 371 or ZOOL 330 or 362; ASTR 101; ATM S 101; GEOL 101; OCEAN 101.

# Norwegian (Scandinavian Languages and Literature)

A grade-point average of 2.50 must be maintained.

#### Teaching Major: Elementary School Emphasis

36 approved credits required. Courses: NORW 220, 221, 222, 223, 224, 225; 300, 301, 302 or 350, 351, 352; 303, 304, 305, 490; SCAND 455 or NORW 450; EDC&I 339.

#### **Teaching Minor: Secondary School Emphasis**

42 approved credits required. Courses: NORW 220, 221, 222, 223, 224, 225; 300, 301, 302 or 350, 351, 352; 303, 304, 305, 450, 490; SCAND 455; EDC&I 339.

# **Physical Education**

### **Teaching Major: Secondary School Emphasis**

55 approved credits required and 19–22 related field courses required. The student is required to demonstrate proficiency through the advanced level in at least two approved physical education activities commonly taught in schools and through the intermediate level in at least eight other activities. Satisfaction of activity proficiencies must be certified by an adviser in the School of Physical and Health Education before the student begins teaching practicum.

Human Movement core courses: PE 250, 325, 331, 332, 350, 410. Specialization courses: PE 290 or 304, 365, 366, 450, 455, 460. Related fields courses: B STR 301; H ED 292; PSYCH 100; SOC 110; ZOOL 118, 119, 208.

# **Teaching Minor: Secondary School Emphasis**

38-40 approved credits required and 19-22 related field courses required. The student must demonstrate competency in physical education activities as described in "Teaching Major: Secondary School Emphasis."

Human Movement 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

55 approved credits required and 19–22 related field courses required. The student must demonstrate competence in physical education activities as described in "Teaching Major: Secondary School Emphasis."

Human Movement core courses: same as those for "Teaching Major: Secondary School Emphasis." Specialization courses: PE 314, 316, 365, 366, 455, 478; PEDNC 310, 311. Related field courses: same as those for "Teaching Major: Secondary School Emphasis."

#### **Physics**

### **Teaching Major: Secondary School Emphasis**

64 approved credits required. Courses: MATH 124, 125, 126 or 134H, 135H, 136H; PHYS 121, 122, 123, 131, 132, 133, 221, 222, 231, 232, 407, 408; approved electives in mathematics, physics, or other natural sciences (minimum of 12 credits). Grades of B or better in PHYS 407, 408. Grade-point average of 2.50 or better at certification.

### **Teaching Minor: Secondary School Emphasis**

Track A: 35 approved credits required; track B: 31 approved credits required. Courses: track A (with biological science or nonscience major)—PHYS 114, 115, 116, 117, 118, 119, 210, 211, 212, 407; track B (with physical science or mathematics major)—PHYS 121, 122, 123, 131, 132, 133, 221, 222, 407, 408. Grades of B or better in PHYS 407, 408. Grade-point average of 2.50 or better at certification.

# **Political Science**

#### **Teaching Major: Secondary School Emphasis**

50 approved credits required. Courses: POLS 101, 102; 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. POLS 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: POLS 101,

102; 5 approved credits from upper-division political science electives; and the remaining credits from each of the following broad fields\*: (1) Political Theory and Public Law, (2) Government, Politics, and Public Administration, and (3) Comparative Government and International Relations.

\* The Department of Political Science maintains a current list of approved courses for the three broad fields.

# Psychology

# **Teaching Major: Secondary School Emphasis**

50 approved psychology credits required. Courses: PSYCH 100 or 101 or 102; 231 or 232 or 233; 213 or 217 and 218; psychology electives (MATH 106 is prerequisite for PSYCH 213; MATH 157 is prerequisite for PSYCH 217).

#### **Teaching 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 420, 421, 422; 451, 452, 453; 461, 462, 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.

### Téaching 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.

#### 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

Caching Major. Secondary School Empiresis

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.

#### **Speech Education**

#### **Teaching Major: Secondary School Emphasis**

59 approved credits required. Courses: SPCH 102; plus 100 or 203 or 103 (only 3 credits of 103 applicable to major requirements); 140, 220, 270, 300, 334, 348; EDC&I 357; SPCH 373; 10 18 credits in approved electives, including 6 credits at the 400 level.

### **Teaching Major: Elementary School Emphasis**

48 approved credits required. Courses: SPCH 102; plus 203 or 100 or 103 (only 3 credits of 103 applicable to major requirements); 140, 300, 303, 348, 373; 455; 15 19 credits in approved electives, including 6 credits at the 400 level.

#### **Teaching Minor: Secondary School Emphasis**

33 approved credits required. Courses: SPCH 102; plus 100 or 203 or 103 (only 3 credits of 103 applicable to minor requirements); 270; 373; 456; or EDC&I 357; 7 15 credits in approved electives including 6 credits at the 400 level.

# Swedish (Scandinavian Languages and Literature)

A grade-point average of 2.50 must be maintained.

#### **Teaching Major: Elementary School Emphasis**

35 approved credits required. Courses: SWED 220, 221, 222, 223, 224, 225; 300, 301, 302 or 350, 351, 352; 303, 304, 305, 306, 307, 308, 450; 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, 306, 307, 308, 450, 490; EDC&I 339.

# THE STANDARD CERTIFICATE

Admission to the College of Education or to any of the programs within the college assumes and is 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

**EDUCATION** 



requirements of the State Board of Education, for the Standard Certificate are as follows:

# **Basic Provisions, General**

(1) possession of a valid Provisional Certificate; (2) at least two years of successful teaching on the Provisional Certificate or equivalent at the elementary or secondary level, or both; (3) completion of 45 quarter credits of approved course work, including completion of deferred courses from the Provisional Certificate pattern and compliance with any appropriate suggestions from the field. Such work must represent study in both professional and academic fields.

# Specific Requirements, State Board of Education

1. At least half of the 45 quarter credits in the fifth year must be in upper-division or graduate courses, or both.

2. A maximum of 12 quarter credits may be taken by independent study or extension study, or both.

3. A minimum of  $22\frac{1}{2}$  quarter credits approved by the attesting institution must be completed *in residence* at one institution.

4. A maximum of 30 quarter credits in excess of degree requirements may be taken before or during the first year of teaching.

5. A minimum of 15 quarter credits must be taken after one year of successful teaching experience.

6. A college-level course in Washington State history must be completed by intermediate (grades 4, 5, and 6) and all secondary social studies teachers.

7. An average grade of C or higher must be attained in all course work required for the fifth year.

A plan for the acquisition of the Standard Certificate must be filed in the College of Education advisory office when the conversion program is started.

All course work completed at other institutions is subject to review before acceptance. Approval prior to enrollment is urged.

# EDUCATION GRADUATE PROGRAMS

Also see "Graduate Programs and Degree Policies," page 57.

Graduate Program Adviser Roger G. Olstad Office of Graduate Studies 210 Miller 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 in full-time residency, including 27 quarter credits for dissertation in addition to the course work specialization; a General Examination, written and oral; a Final Examination after the dissertation has been satisfactorily completed.

Traditionally, the Doctor of Philosophy degree is offered with experiences tailored individually for aspirants to this degree. A student may concentrate his studies and research with emphasis on one of a particular set of topics, such as elementary education, general curriculum, language arts education, learning resources, mathematics education, science education, secondary education, social studies education, educational counseling and school psychology, learning and thinking, measurement and evaluation, educational policy studies (foundations of education) including history of education and philosophy of education, higher education, or special education including exceptional children.

#### **Doctor of Education Degree**

Assuming the student has completed the master's degree or its equivalent, requirements for the Doctor of Education degree are: a minimum of two academic years of resident study, of which one must be in full-time residency, including 27 quarter credits for dissertation\* in addition to the course work specialization; a General Examination, written and oral; a Final Examination after the dissertation has been satisfactorily completed.

The Doctor of Education degree is offered with experiences tailored individually for aspirants to this degree.

\* 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. A student may concentrate his studies and research with emphasis on one of a particular set of topics, such as elementary curriculum, general curriculum development, language arts education, learning resources, mathematics education, science education, secondary curriculum, educational administration, higher education, or special education including exceptional children.

# Administrators' Credentials

The revised requirements for administrators' credentials were adopted by the State Board of Education on March 24, 1956, and became effective June 1, 1957. All applications are to be made to the State Superintendent of Public Instruction, Olympia, through the intermediate school district in which the applicant's school is located.

# I. Provisional Principal's Credential (Elementary, Secondary, and General)

1. Applications for the Provisional Principal's Credential may be filed by students with full graduate standing in the Graduate School after one year of successful teaching and prior to completion of requirements, preferably before the applicant has begun study for the credential.

2. A total of 54 quarter credits beyond the bachelor's degree in an approved institution is the required minimum. Of these 54 credits, 24 must be in an approved program that will make a maximum contribution to the individual's responsibilities as a principal.

3. At least 9 credits of the 54 quarter credits must have been earned *after* completion of the Standard Certificate. These 9 quarter credits shall be in courses in administration, curriculum, and supervision on the elementary or secondary level, or both. These 9 credits must be earned in residence at the University of Washington.

4. A total of 12 credits toward the 24 may be transferred from an approved institution. Not more than 6 of the 24 credits may be transferred from an approved institution. Not more than 6 of the 24 credits may be earned by extension, and no credits earned in independent study may be applied. The combination of transfer and extension work may not exceed 12 credits.

5. Laboratory and internship type experiences shall be a part of the program. These shall take the form of supervised administration experiences in school situations.

6. Proof of three years of successful teaching experi-



ence on the appropriate level or levels is one of the 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 initial is valid for not more than four years of experience as a principal in elementary schools of six or more teachers or in accredited middle, junior, senior, four-year, or six-year high schools.

# II. Standard Principal's Credential (Elementary, Secondary, and General)

1. An application for the Standard Principal's Credential may be filed during the applicant's second year of experience as a principal and prior to completion of requirements.

2. After completion of requirements for the Provisional Principal's Credential, 12 credits must be earned in residence at the University of Washington for a Standard Principal's Credential. These credits shall be in approved courses in administration, supervision, and curriculum on the elementary or secondary level, or both.

3. Possession of a master's degree is required for the Standard Principal's Credential. Requirements for this degree may be completed in the College of Education or in an academic department.

4. Three years of successful teaching experience, of which two must be as a full-time classroom teacher, and three years of experience as a principal on the appropriate level or levels are requirements for a Standard Principal's Credential.

5. Granting of the credential is dependent upon proof that the applicant possesses the qualities of leadership necessary for school administration and upon an evaluation of the applicant's success in positions already held.

6. An official program plan must be arranged in consultation with a faculty supervisor in Educational Administration. 7. The Standard Principal's Credential is valid as long as the holder's teaching certificate is valid.

# III. Provisional Superintendent's Credential

1. An application for the Provisional Superintendent's Credential may be filed after the applicant has completed preparation for a Standard Principal's Credential and prior to completion of requirements.

2. After completion of requirements for the Standard Principal's Credential, 12 credits must be earned in residence at the University of Washington for a Provisional Superintendent's Credential. These credits shall be in approved courses in administration, supervision, and curriculum on the elementary or secondary level, or both.

3. Possession of a master's or higher degree is required for the Provisional Superintendent's Credential. Requirements for this degree may be completed in an academic department or in the College of Education.

4. Candidates with experience as principals at only one level are to have laboratory experience at the opposite level. These experiences are to be planned with the applicant, the teacher education institution, and school administrators.

5. Three years of successful teaching experience, of which two must be as a full-time classroom teacher, and four years of administrative experience on the appropriate level or levels are requirements for a Provisional Superintendent's Credential.

6. Granting of the credential is dependent upon proof that the applicant possesses the qualities of leadership necessary for school administration and upon an evaluation of the applicant's success in positions already held.

7. An official program plan must be arranged in consultation with a faculty supervisor in Educational Administration.

8. The Provisional Superintendent's Credential is valid for three years of administrative experience.

# IV. Standard Superintendent's Credential

•1. Application for the Standard Superintendent's Credential may be filed by the candidate after one year's service as a superintendent and prior to completion of requirements.

2. After completion of the Provisional Superintendent's Credential requirements, 12 credits must be earned in residence at the University of Washington for a Standard Superintendent's Credential. These credits shall be in approved courses in the areas of administration, supervision, and curriculum.

3. Three years of successful superintendent's experience are required for granting of a Standard Superintendent's Credential. 4. An official program must be arranged in consultation with a faculty supervisor in Educational Administration.

5. The Standard Superintendent's Credential is valid as long as the holder's teaching certificate is valid.

# ENGINEERING

activities on a professional level will need graduate study leading to the master's and doctoral degrees. Increasingly, the master's degree is coming to be considered as the first professional engineering degree.

For undergraduate students, the College of Engineering offers a flexible curriculum that suits the varied needs of many men and women, both in established departmental programs and in new interdisciplinary studies. Also, the college has active educational and research programs, both departmental and interdisciplinary, at every graduate level.

The College of Engineering has been a major unit of the University since 1899, and the first engineering degree awarded was in mining engineering in 1900. Progressively added were degrees in civil engineering (1901), electrical engineering (1902), mechanical engineering (1906), chemical engineering (1907), aeronautical engineering (1929), and nuclear engineering (1955). In 1972, 1,740 undergraduates and 708 graduate students were enrolled in engineering programs taught by a faculty of about two hundred members.

# **College Facilities and Services**

Teaching and research activities of the College of Engineering occupy thirteen major campus buildings and portions of others. All except the hydraulics laboratory are grouped around the engineering quadrangle. These buildings, most of them relatively new, contain the col-

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 bachelor's degree is immediately useful for beginning to solve technical problems in government and industry. However, those engineers who plan to take up research, college teaching, or creative lege's offices, classrooms, and numerous research and teaching laboratories. A new central engineering library that serves the college supplements the nearby chemistry, mathematics, and physics libraries in providing outstanding collections of books, periodicals, technical reports, and patents of interest to engineers. The University's Computer Center, located within the College of Engineering complex, is convenient for many engineering studies.

Facilities of particular interest to students include a large wind tunnel, a one-hundred kilowatt nuclear reactor, a forty-four-acre antenna site, a microwave laboratory, a large structural testing laboratory, an extensive hydraulics laboratory, and a laboratory for heat-transfer studies.

# Aerospace Research Laboratory

# Director

Abraham Hertzberg 120 Aerospace Research Laboratory

The Aerospace Research Laboratory is an interdepartmental and interdisciplinary facility of the College of Engineering operated for the conduct of fundamental and applied engineering research. Faculty and students from throughout the college undertake research that is often complementary to that being conducted within the other departments and divisions of the college. Much of the research is related to the interests of the National Aeronautics and Space Administration, which provided funding for the laboratory building. Present research areas include gas flow at high Reynolds numbers, high-energy lasers, controlled thermonuclear reactions, and flight and structural mechanics.

# Ocean Engineering Laboratory Director

Gordon M. Gray Applied Physics Laboratory

Housed in both the University of Washington Applied Physics Laboratory and the Harris Hydraulics Laboratory, the Ocean Engineering Laboratory serves as a focus for faculty and graduate student research in the field of ocean engineering. The University of Washington has one of the largest and most varied marine programs in the United States, and the Ocean Engineering Laboratory reflects the activities of the College of Engineering in the marine field. Research in the development of floating breakwaters, marine acoustics, new techniques for modular ship construction, and the removal of flotsam from Puget Sound are among the types of activities undertaken by the laboratory.

# **Office of Engineering Research**

Director H. Myron Swarm 376 Loew

The Office of Engineering Research performs two main functions. First, it stimulates, promotes, and coordinates investigations and research in all fields of engineering. The actual research, however, is carried on either in the departments of the college or in the interdepartmental laboratories.

As its second function, the office provides graduate students with opportunities to extend their professional education in courses of study leading to the master's or doctoral degree. It does this by offering a number of research assistantships to highly qualified graduate students who are assigned to the academic departments.

# **College Publication**

Current research findings appear in the quarterly journal, *The Trend in Engineering*, which has a circulation of five thousand, including two hundred international institutions. *The Trend in Engineering* is published in newsletter format twice a year and is sent to twenty thousand alumni, professional engineers, educators, and members of industry throughout the United States.

# **Student Organizations and Services**

Various student activities are supervised by an Engineering Student Council, which comprises representatives elected from student organizations in the departments of the college, as well as from Tau Beta Pi, the engineering honorary fraternity.

Students also serve with faculty on engineering policy committees, which make recommendations concerning teacher evaluation, curriculum revisions, advising, grading systems, and other matters of interest to students and faculty.

# **Professional and Honorary Societies**

All of the major professional engineering societies, such as the American Society of Civil Engineers, the Institute of Electrical and Electronic Engineers, and the American Society of Mechanical Engineers, have student chapters on the campus, and every engineering student is encouraged to join the chapter that represents his or her field of interest. The college also has a student chapter of the Society of Women Engineers. Honor societies open to engineering students are Tau Beta Pi and Sigma Xi.



# **Financial Aid**

The college offers financial assistance to undergraduates through industrial scholarships and limited loan funds. Scholarship information is available at the college advising offices or at the Office of Student Financial Aid, 170 Schmitz. Most scholarships are given after a year in residence by the student. Qualified graduate students may obtain financial assistance through industrial and governmental fellowships; National Science Foundation, National Aeronautics and Space administration, and Public Health Service traineeships; research assistantships; or teaching assistantships. A student seeking such aid should apply at the office of his or her major department.

# UNDERGRADUATE PROGRAMS

In 1971, the College of Engineering inaugurated new, flexible engineering curricula that extended the variety of educational experiences available to its students. The new curricula also facilitated transfer from community colleges, as well as to and from other four-year programs of study.

#### Admission

Students who wish to enter the College of Engineering as freshmen are eligible to do so if they are eligible for admission to the University. In addition, students may apply for admission to the college with advanced standing, provided they are qualified students in good standing at an accredited institution. Details of admissions qualifications for both freshmen and transfer applicants can be found in the "Undergraduate Education" section of this catalog. The section also contains information about the qualifying mathematics tests in the precollege testing program.

Students who intend to pursue an engineering career should choose high school electives that provide the background essential to engineering studies. Elementary functions, algebra, trigonometry, physics, and chemistry are prerequisites for the first-year courses in engineering. Those who do not take these subjects in high school must take equivalent courses at the University in addition to the regularly required program, although this usually increases the time needed for earning a degree. The college also recommends electing a fourth year of mathematics and senior composition.

# Advising Center Executive Director

Donald C. McNeese 111 Sieg Until a student enters a departmental program of study, the Engineering Advising Center will help in curriculum planning and will maintain his or her records. Some students who already have chosen a field of engineering can enter a particular degree program as soon as they wish. Most, however, will want to spend several quarters investigating the different fields of engineering and will stay in the college program until the junior year. Therefore, an adviser in the center usually will assist new students in their initial registration and their early planning of a Program of Study.

In deciding on a major, a student can use the resources of the center, elect to take one or more career planning courses, and seek out advisers and faculty members in the departments. Once a student has made a decision, records will be sent to the appropriate department and he or she will work with an adviser there. A student choosing one of the nondepartmental programs (B.S.E. or B.S.) will work with an adviser for this program, and his or her records will remain in the advising center.

# **Graduation Requirements**

Students working toward bachelor's degrees in engineering must meet the general requirements of the University and the college, as well as the particular course requirements of their major departments. College and departmental requirements appear below.

### **College Requirements**

Selecting courses that fulfill the college's general requirements, as well as those specified by each department, is the responsibility of each student. Each student is urged to check carefully in ascertaining the course and credit requirements for the type of program in which he or she is enrolled.

# **Types of Programs**

The College of Engineering offers three basic types of undergraduate programs leading to Bachelor of Science degrees:

Departmental Program: This program leads to a Bachelor of Science degree in a designated field of engineering and is tailored for the student who wishes to practice professional engineering in a standard branch of engineering or who may wish to continue to graduate school. The curriculum for this degree carries professional accreditation by the Engineers Council for Professional Development, principal engineering accrediting agency in the United States. Four-year curricula leading to bachelor's degrees are offered in the departments of Aeronautics and Astronautics, Chemical, Civil, Electrical, and Mechanical Engineering, and in the Department of Mining, Metallurgical, and Ceramic Engineering. Nondepartmental Program: Leading to a Bachelor of Science in Engineering degree, this program is designed for the student who has some well-directed, special educational objectives that a departmental program does not satisfy. This curriculum might be in bioengineering, computer science, environmental engineering, mineral resources, ocean engineering, nuclear engineering, or some other interdisciplinary or specially approved area and could serve as preparation for graduate work in these or allied fields (see the "Interdisciplinary Engineering Studies" section of this catalog).

Nonprofessional Program: Leading to the Bachelor of Science degree, this program is intended for the student who wishes to have a significant exposure to science and engineering courses, but who does not plan to engage in professional engineering practice. This program provides opportunity for work in such specific areas as environmental studies and scientific and technical communication. It also permits an excellent preparation for the study of business, law, or medicine (see the "Interdisciplinary Engineering Studies" section of this catalog).

# **General Requirements**

Each type of program has the following requirements:

Mathematics (21 credits): MATH 124, 125, 126, plus 6 credits at 200 level or higher (MATH 205, 238, and 327 are suggestions).

Natural science (21 credits): PHYS 121, 122 (8 credits), general chemistry (4 credits); plus 9 credits. Sciences, especially chemistry and physics, are important to all engineering studies. Students may satisfy the total requirements by taking CHEM 140 (4 credits), 150 (4 credits), 151 (2 credits), and PHYS 121 (4 credits), 122 (4 credits), 123 (4 credits). A student with well-defined objectives, however, may elect advanced courses from chemistry, physics, atmospheric sciences, geological sciences, geophysics, oceanography, astronomy, or biology (elementary survey courses are not acceptable).

Engineering college courses or alternates (28 credits) in two groups: (1) functional techniques (12 credits in at least three of the following areas)—visual presentation, written and oral communication, computational techniques, design and synthesis, and laboratory techniques (see "College Courses" section). (2) engineering science (16 credits in the following)—materials, discrete mechanics, continuum mechanics, linear systems, thermodynamics. In special cases and with the major adviser's approval, a student may include in the engineering science category various courses in mathematics, science, and engineering (usually upper-division courses and not in the major field; see "College Courses" section).

Technical preparation (0-8 credits): See individual departmental requirements.

Humanities and social sciences: 30 credits required, with a minimum of 10 in both.

Engineering course of studies (60–65 credits): See requirements of major departments or "Interdisciplinary Engineering Studies" section.

Free electives: 12–20 credits to make the total of 180–185 credits required for graduation.

Upper-division military courses can be applied to meet the free elective requirement up to a maximum of 9 credits. Physical education activity courses at the 100 level cannot be used for free elective credit.

Courses taken to satisfy minimum University entrance requirements or courses of a lower level than minimum engineering requirements cannot be used to meet graduation requirements.

# **Special Programs**

#### **Cooperative Work-Study**

The Cooperative Work-Study Program of the College of Engineering permits engineering undergraduate students to combine practical engineering experience with their studies. Starting with the sophomore year and continuing through the junior year, selected students alternate six-month periods of work with six-month periods of study. The freshman and senior years do not include work periods. Completion of the program requires time equivalent to an additional academic year, because the alternating periods of work and study require three, instead of two, calendar years to finish the middle academic years of study. Cooperating organizations include aerospace firms, electric and electronic equipment manufacturers, power companies, manufacturers of machinery and mechanical equipment, construction and engineering firms, and state and federal agencies.

Enrollment in the Cooperative Work-Study Program presently is limited to undergraduates in civil, electrical, or mechanical engineering. Additional information and a detailed publication on this program may be obtained from the University of Washington College of Engineering, Coordinator of the Cooperative Work-Study Program, 371 Loew, FH-10, Seattle, Washington 98195.



# Industrial Engineering

In addition to the four-year curricula, the college offers a course of study in industrial engineering for which a second bachelor's degree is awarded at the end of five years. The first four years provide the standard four-year curriculum of any branch of engineering in which the college grants a bachelor's degree, and the fifth includes courses in industrial management and related subjects.

# CONTINUING EDUCATION PROGRAMS

Rapid advances in applied mathematics and in the physical and engineering sciences make it especially important that practicing engineers who have been out of school more than ten to fifteen years continue to update their educations.

The growth of knowledge and the accompanying changes in the engineering practices have placed higher and higher demands on the analytical ability and fundamental preparation of practicing engineers. Some analytical tools that were available only in graduate school a decade or two ago are now required material in the undergraduate engineering programs. As a result, older engineers find it increasingly difficult to communicate with their younger counterparts. They also find it more difficult to read current engineering and scientific literature unless they first have undertaken an intensive study of applied mathematics, physics, and related subjects. Taking courses directed toward a degree, however, is seldom possible for practicing engineers.

Consequently, the College of Engineering offers a variety of Continuing Education programs, which may be divided into two categories: (1) courses carrying Continuing Studies credit, and (2) noncredit courses, short courses, and conferences.

In general, both kinds of Continuing Education courses are offered according to need and are announced in *Spectrum*, in special circulars, and in the news media.

# **Courses Carrying Continuing Studies Credit**

In 1966, the University of Washington established a category of courses that carry Continuing Studies credit. This specially designed credit is *not* intended for application toward a University degree. Instead, the program's aim is to satisfy the immediate needs, for example, of professional engineers and their employers. Quantitatively, 1 credit in Continuing Studies requires the same amount of work as is normally needed for one quarter of University credit within the degree programs.

All successfully completed courses are entered on an official transcript available to the student as part of his educational record.

Engineering courses in this category may take many forms. They may be offered over a quarter's duration, with lectures given during the evenings or weekends; or, they may take the form of the Continuing Education for Engineers Series, which combines the advantages of a residential course with those of independent study.

# **Short Courses and Conferences**

To serve the needs of the state's engineering and scientific community, from time to time the University offers short, intensive courses on advanced topics. Because of the nature of these courses, formal evaluation of the participants is not possible, hence these courses usually do not carry Continuing Studies credit. Each course ordinarily covers a specialized topic and is offered on a level that approaches the forefront of current knowledge or technology.

# GRADUATE PROGRAMS

Students who intend to work toward advanced degrees must fulfill the admission requirements of the Graduate School and of the department in which they expect to major. Acceptance also will depend upon the availability of the faculty and facilities for the program desired. Students must satisfy the departmental and Graduate School requirements for an advanced degree that are in force at the time the degree is to be awarded.

# **Departmental Graduate Programs**

Graduate study leading to the Master of Science degree with departmental designation or to the Doctor of Philosophy degree is available in all departments of the college. In addition, the Master of Science degree is available in the Department of Civil Engineering, as is the Master of Science in Engineering degree in both civil and mechanical engineering departments. The Department of Aeronautics and Astronautics has a two-year Master of Aeronautics and Astronautics degree program.

# **Interdepartmental Graduate Programs**

# Inter-Engineering Group

Through the Inter-Engineering Group, under the direction of Associate Dean Kermit L. Garlid and interdepartmental faculty members, a program leading to the Master of Science in Engineering degree is offered. This degree is for qualified graduate students engaged in an interdepartmental or intercollege graduate program developed with the assistance of a faculty adviser and approved by the Inter-Engineering Group. The degree provides for graduate studies involving work in more than one engineering department or in newly developing fields not yet recognized by departmental status. Examples are bioengineering, engineering mechanics, environmental engineering, ocean engineering, and social management of technology. Students may apply for admission directly into the inter-engineering program or may transfer from one of the established engineering departments. See the "Interschool or Intercollege Programs" section of this catalog for descriptions of bioengineering and social management of technology.

#### Engineering Mechanics

Graduate study in engineering mechanics is offered through the cooperation of the departments of Aeronautics and Astronautics, Civil Engineering, and Mechanical Engineering. The student usually enrolls in one of these departments. Work can lead to the Master of Science degree with departmental designation, to the Master of Science in Engineering degree, or to the Doctor of Philosophy degree.

Students who enter this program should have completed an undergraduate degree in a field such as aeronautical, civil, or mechanical engineering, physics, engineering physics, mathematics, or an equivalent. The course program is planned through consultation with an adviser to fit the student's interests and background. The student's program ordinarily includes continuing study in mathematics and the engineering sciences (solid mechanics, fluid mechanics, dynamics, thermodynamics), and must satisfy the basic requirements of the department in which he or she is enrolled.

### Ocean Engineering

313 Harris Hydraulics Laboratory

The expanding and diversifying needs of society are exerting greater pressures on the water environment, both fresh and salt, from the edge of the shore to the deep lake or ocean. Problems that arise with this greater utilization cross the borders of many disciplines, such as biology, economics, fisheries, geology, law, oceanography, physics, public affairs, and transportation. Informed and careful planning and management of the marine resources is essential, because the impact of actions taken today will have lasting effects. To provide a curriculum for training the engineer to practice in this arena, programs in ocean engineering are offered as specialties in the several departments of the College of Engineering. Their objective is to develop a strong competence in one of the branches of engineering, with a capability of using that basic competence to cope with the interdisciplinary problems that arise in the marine setting.

Requirements for entry into the program and for acquisition of the graduate degrees with specialization in ocean engineering are those of the department the student selects as fitting his or her career objectives. The interdisciplinary aspects of each study program are evidenced by the inclusion of marine-oriented courses from the engineering departments and from the special subject areas mentioned above. The research can be carried on either in individual departments or in the ocean engineering laboratory facilities. Although the program is primarily at the graduate level, interested undergraduates may participate by attending seminars, by selecting their free electives in the background areas of the special subjects, or by planning an individual program through the Bachelor of Science in Engineering degree offering in the College of Engineering.

# DEPARTMENTAL AND INTERDEPARTMENTAL PROGRAMS

College Courses Executive Director T. W. Macartney .111 Sieg

College courses are nondepartmental courses used by both engineers and nonengineering students to provide a general technological component to their courses of study. The college courses carry the prefix ENGR and are taught by faculty drawn from throughout the college.

For the engineering student, college courses in functional techniques and engineering science provide skills essential to engineering and complement the mathematics and science part of the curriculum. The courses broaden the technical exposure of the student and show how similar principles are applied in the various engineering disciplines.

For nonengineering students, college courses provide an essential technological component needed for many courses of study. Through such courses as ENGR 307, The Energy Question, or ENGR 305, Environmental Radioactivity, 'students also can study important present-day concerns about the impact of technology on society, including a rational analysis of the technical and social needs involved.



# Curriculum in the First Two Years

Students are expected to complete most of the basic requirements in mathematics, natural science, functional techniques, engineering science, and technical preparation 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.

# FIRST YEAR

MATH 124, 125, 126 (15 credits); science (12-14); career planning elective (1); functional techniques (8-12); humanistic-social studies or electives (11-17); total-45.

# SECOND YEAR

This schedule may be altered to include early studies in a major field. Mathematics (6-9 credits); science (8-9); engineering science (12-16); humanistic-social studies or electives (9-15); total-45.

# FUNCTIONAL TECHNIQUES AREA

Visual Presentation: ENGR 123, Graphical Analysis (1-8, maximum 8); ART 105, 106, or 107, Drawing; ARCH 310, 311, 312, Introduction to Design Graphics.

Written and Oral Communication: ENGR 130, Techniques of Communication (3); ENGR 131, Scientific and Technical Reporting (3); skill courses in English and speech.

Computational Technology: ENGR 140, Measurement and Experimentation (4); ENGR 141, Computer Applications to Engineering Problems I (4); MATH 114. Elementary Computer Programming; MATH 374, Principles of Digital Computers and Coding.

Design and Synthesis Technology: ENGR 150, Design and Synthesis (3); ARCH 300, 301, 302, Introduction to Design-Laboratory; ART 109, 110, Design.

Laboratory Techniques: CHEM 151, General Chemistry Laboratory; CHEM 241, 242, Organic Chemistry Laboratory; MICRO 301, General Microbiology; MICRO 320, Media Preparation; PHYS 131, 132, 133, General Physics Laboratory; PHYS 231, 232, Electric Circuits Laboratory; PHYS 331, Optics Laboratory.

# **ENGINEERING SCIENCE AREAS**

Materials: ENGR 170, Fundamentals of Materials Science (4 credits); ENGR 171, Materials Science Laboratory (1).

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Discrete Mechanics: ENGR 180, Engineering Statics (4); ENGR 230, Kinematics and Dynamics (4).

Continuum Mechanics: ENGR 240, Introduction to Continuum Mechanics (4).

Linear Systems: ENGR 190, Introduction to Logical System Design (3); ENGR 250, Introduction to Engineering System Dynamics (4).

Thermodynamics: ENGR 260, Thermodynamics (4).

Career Planning: ENGR 110, Career Planning I (1); CER E 198, Career Planning II (1).

# AERONAUTICS AND ASTRONAUTICS 206 Guggenheim

Aeronautics and astronautics is based on an understanding of the engineering sciences and the use of these sciences to develop the engineering technology associated with transportation vehicles operating underwater, in air, in space, or at the interface of these environments.

Study of dynamics and of the mechanics of fluids, gases, and solids in the junior year provides the foundation for senior-level studies in the engineering technology of aeronautics and astronautics. In the senior year, the student selects a professional objective, either to continue studies at the graduate level or to enter directly into professional practice.

Graduate studies retain the emphasis on understanding of the engineering sciences and on the application of these sciences to the advancement of newly developing technologies. The faculty is widely recognized for its contributions in many fields associated with aeronautics and astronautics, such as gas dynamics, propulsion, structural mechanics, orbital mechanics, stability and control, wind-tunnel testing, experimental stress analysis, and applied mathematics, as well as in continuum mechanics, high-energy laser devices, and low-pollution energy converters. Graduate students also can use the department affiliation as a base for a variety of interdisciplinary graduate studies in the college.

# Faculty

R. J. H. Bollard, Chairman; Ahlstrom, Christiansen, Decher, Dill, Eastman (emeritus), Fyfe, Ganzer, 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 224, 238, 327 in satisfying the mathematics requirement; and in fulfilling the engineering science requirement, the inclusion of ENGR 170, Fundamentals of Materials Science; ENGR 180, Engineering Statics; ENGR 240, Introduction to Continuum Mechanics; and ENGR 260, Thermodynamics.

# THIRD YEAR

First quarter: A A 300 (3 credits), A A 310 (3), A A 320 (2), A A 330 (3), electives (4); total—15. Second quarter: A A 301 (3), A A 311 (3), A A 321 (2), A A 331 (3), electives (4); total—15. Third quarter: A A 302 (3), A A 312 (3), A A 322 (2), A A 332 (3), electives (4); total—15.

### FOURTH YEAR

27 credits of senior-level electives are to be chosen from the following: gas dynamics—A A 400, 401, 402; aircraft design—A A 410, 411, 412; structural mechanics —A A 430, 431, 432; flight mechanics—A A 440, 441, 442; space mechanics—A A 450, 451, 452; propulsion—A A 460, 461, 462; systems dynamics and aeroelasticity—A A 480, 481; acoustics—A A 482; applied mathematics—A A 370, 470.

In choosing these electives, it is expected that the student will follow at least two one-year sequences in areas of specialization. Additional electives, beyond the 27 credits in aeronautics and astronautics, are required to make a total of 180 credits for graduation.

Students may wish to use some of their free elective credits and remaining credits in engineering science to augment their preparation in aeronautics and astronautics. Appropriate subject areas would be: electronics, automatic control, mathematics, applied mathematics, and physics.

Additional mathematics or applied mathematics would be particularly appropriate for those students planning to continue into the graduate program.

Senior programs should be planned with the assistance of a faculty 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** 

J. Kevorkian

Students who intend to work toward advanced degrees must apply for admission to the Graduate School and meet the requirements outlined in the "Graduate Study" section of this catalog.

# Master of Science in Aeronautics and Astronautics Degree

Students who have earned a bachelor's degree in engineering, physics, or mathematics are eligible for admission. Degree candidates must complete an approved Program of Study. This program is tailored to the needs and interests of each student, but must possess breadth, through study of a variety of subjects, and depth, through extensive study of a chosen field of specialization.

The program may consist of either 39 credits of course work, or 30 credits of course work and a minimum of 9 credits for thesis. The following courses are suggested to provide the required breadth: A A 504, 516, 524 or 527, 530, 567, 568, 569, 571, 575. The program usually includes 567, 568, 569, and three of the remaining six courses. Depth is obtained through a choice of electives from among the courses available in this department. A minimum of three quarters of full-time study or the equivalent is required. A foreign language is not required.

# Master of Aeronautics and Astronautics Degree

The Master of Aeronautics and Astronautics degree is intended to provide course work and research beyond that usually included in the program for the degree of Master of Science in Aeronautics and Astronautics. The student must complete an approved program of study and research, which usually consists of a prior Master of Science degree, followed by 30 credits of course work and a thesis, for which 9 credits are given.

### **Doctor of Philosophy Degree**

The doctoral program consists of lectures, seminars, discussions, and independent study, enabling the student to master a particular field and to demonstrate the ability to make original contributions in that field. The formal steps toward obtaining the degree are listed in the "Graduate Study" section of this catalog. In addition to those requirements, the student is expected to be



in continuous full-time residence for one academic year after advancement to Candidate standing.

Admission to the Graduate School does not imply admission to the Ph.D. program. A decision on admission to the Ph.D. program usually is based upon the performance in the first year of graduate study. Students who have achieved a 3.50 grade-point average will be admitted to the doctoral program. In some cases, admission is determined by the department's evaluation of evidence of superior ability, achievement, and motivation for advanced study and research.

# CHEMICAL ENGINEERING

105 Benson

Chemical engineering is a branch of engineering that deals principally with the development and application of processes and equipment whereby matter is treated to induce a change in chemical composition.

### Faculty

R. Wells Moulton, Chairman; Babb, Berg, David, Finlayson, Gardner, Garlid, Heideger, Hoffman, Johanson, Larson, McCarthy, Sarkanen, Sather, Sleicher.

The chemical engineering graduate of today must cope with new and complex technologies that until recently existed only in the minds of those with vision and imagination. For this reason and many others, today's undergraduate is presented with a less descriptive and a less industry-oriented approach to education than he or she would have been ten to fifteen years ago. Current emphasis is on a more fundamental treatment, offering a good foundation in mathematics, physics, and chemistry. Such a sound, fundamental background, coupled with practical engineering training, is needed to prepare the graduate for work in the wide diversity of problems and the variety of careers offered the chemical engineer of today.

# **Undergraduate Program**

#### **Bachelor of Science in Chemical Engineering Degree**

During the first two years, the student completes the basic requirements of the College of Engineering. CHEM 140, 150, 151, and 160 (14 credits) and PHYS 121 and 122 (8 credits) are recommended to satisfy the natural science requirements. The technical preparation requirement is CHEM 231, 235, and 241 (8 credits). MATH 238 and 327 (6 credits), ENGR 260 (4 credits), together with CH E 200 (3 credits) as a career-planning course, 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

Thesis program: The requirements for this program are a minimum of 39 credits, of which 30 credits are in formal course work and 9 credits are in thesis. The course work usually is divided in the ratio of about two to one between Chemical Engineering and other departments. At least half of these courses must be numbered 500 or above.

Nonthesis program: The requirements for this program are a minimum of 39 credits of course work, including 9 credits of graduate-level design and 3 credits of graduate seminar. The remaining 27 credits are elective and may be courses in engineering, chemistry, mathematics, and/or other fields, depending on the objectives of the student. At least 18 credits of the total must be in courses numbered 500 or above.

### **Doctor of Philosophy Degree**

In addition to meeting the general requirements of the Graduate School, students who wish to work toward the Ph.D. degree must pass a preliminary examination. This examination usually is taken after three quarters of satisfactory graduate study. It is designed to assess the student's comprehension of both undergraduate and graduate material and especially the student's ability to apply fundamental concepts to new and varied situations.

# CIVIL ENGINEERING

201 More

The civil engineer is the designer and builder of the constructed facilities of our society. He or she holds major responsibility for planning, designing, constructing, operating, and preparing impact analyses of transportation facilities, bridges, commercial and industrial structures, river and harbor development, environmental control facilities, and waste disposal systems. The modern civil engineer works with urban planners, architects, economists, sociologists, systems analysts, biologists, and chemists to define problems in our technology-based society, to seek solutions to these problems, and to assess the probable impact of the proposed solutions. An essential part of this role is to bring to the conference table an understanding of what is possible and practicable to be achieved.

The civil engineer requires a broad-based technical education with increased attention given to the social and life sciences. Necessary skills in design and theoretical analyses are founded on mathematics, chemistry, physics, biology, and engineering sciences, such as mechanics, thermodynamics, and systems analyses as well as on appreciation for the effects on living systems of one's developments and structures.

# Faculty -

Dale A. Carlson, Chairman; H. P. Mittet, Associate Chairman; Awad, Baker, Benedict, Betchart, Bogan, Brown, Burges, Charlson, Chenoweth, Clanton, Colcord, Cottrell, Dunn, Ekse (emeritus), Elias, Evans, Gehner, Hammer, Hartz, Hawkins, Hennes (emeritus), Hoag, Horwood, Kent, Konichek (emeritus), Lamb, Macartney, Mar, Mattock, McNeese, Meese, Miller, Nece, Nihan, Norris (emeritus), Pilat, Rhodes (emeritus), Richey, Rossano, Sawhill, Schneider, Seabloom, Secrist, Sergev (emeritus), Sherif, Spyridakis, Strausser, Sylvester, Terrel, Vasarhelyi, Veress, Waggoner, Welch, Wenk, Wessman (emeritus).

#### **Affiliate Faculty**

Baumgartner, Birkeland, Edde, Olesen.

#### Undergraduate Program

Adviser Jack R. Clanton 201 More

#### Bachelor of Science in Civil Engineering Degree

The first two years of the curriculum for the degree of Bachelor of Science in Civil Engineering are administered by the College of Engineering. The junior year provides a strong core in civil engineering planning, analysis, and design, with emphasis on problem formulation and the systems approach. A flexible senior year enables the student to prepare either for early entry into professional practice or for graduate study, to specialize, or to become a generalist.

#### THIRD YEAR

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), engineering science (4)\*; total—16.

#### FOURTH YEAR

Civil engineering electives (18 credits), humanities and social sciences (15) †, electives (15) ‡; total-48.

#### **Graduate Programs**

Graduate Program Adviser H. P. Mittet

# Master of Science in Civil Engineering, Master of Science in Engineering, Master of Science Degrees

The Department of Civil Engineering offers courses leading to the degrees of Master of Science in Civil Engineering, Master of Science in Engineering, Master of Science, and Doctor of Philosophy.

The three master's degree programs are intended to accommodate the needs of three categories of students: The M.S.C.E. is for those who have an undergraduate degree in civil engineering and plan to continue with their professional training; the M.S.E. is for other engineering graduates who wish to do graduate work in civil engineering; and the M.S. is for those whose Bachelor of Science degrees are not in engineering, but who desire to apply their training in science to the solution of problems in some specific sector related to civil engineering.

Graduate work is offered in most fields of civil engineering through the divisions of Structural Engineering and Engineering Mechanics; Transportation, Construction, and Geometronics; and Water and Air Resources.

Requirement for the master's degree is completion of a

In addition to 12 credits required in first and second years.

In addition to 15 credits required in first and second years.

In addition to 5 credits required in first and second years.

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minimum of 39 credits, of which 30 credits must be in formal course work and 9 are in thesis.

# **Doctor of Philosophy Degree**

Students working for the Ph.D. degree must complete an approved Program of Studies and research that usually require two or three years' study beyond the master's degree.

# ELECTRICAL ENGINEERING

211 Electrical Engineering

Electrical engineering is a professional field that deals with the control of electricity and the electrical properties of materials used by mankind. Typical major areas of interest are electrical generation and transmission, electronic computation, communication systems, and electro-optical components and systems. The educational program of the department is based upon mathematics, physics, and chemistry and their application to electrical problems. Specific experience in electrical science, analysis, and design are also essential features.

Because of the rapidity with which new discoveries are made and engineering practice is revised, it is necessary to emphasize the fundamental principles of the field, rather than the details of current practice. The close relationship between technology and society also requires a significant emphasis on studies in the humanities and social sciences.

The bachelor's degree is the entry level for many jobs. However, the electrical industry is so complex that many professional jobs require education at the master's level, and there are also opportunities in industry, government, and education for those that have received the Ph.D. degree.

#### Faculty

Daniel G. Dow, Chairman; Alexandro, Andersen, Auth, Bergseth, Bjorkstam, Blood, Carlson, Clark, Cochran (emeritus), Damborg, Daniels, Dow, Duff, Eastman (emeritus), Ehrenberg, Golde, Guilford, Guy, Harris, Harrison (emeritus), Helms, Hernandez, Hill, Hoard (emeritus), Holden, Hsu, Ishimaru, Johnson, Lauritzen, Lewis, Lytle, Martin, Moritz, Noe, Noges, Peden, Pinter, Potter, Redeker, Reid, Reynolds, Robbins (emeritus), Rogers, Sigelmann, Smith (emeritus), Swarm, Yee.

# Affiliate Faculty

Ancker-Johnson

# Undergraduate Program

# Bachelor of Science in Electrical Engineering Degree

In the student advising office, 213 Electrical Engineering, faculty, staff, and student assistants are available on a posted schedule. For general academic advising or course scheduling, the curriculum adviser or advising assistant should be consulted. Faculty members representing the professional groups in the department are available for professional and career advising. Students who have not chosen a major are encouraged to talk with any or all of the advisers. Also available in 213 Electrical Engineering are copies of the *Bachelor's Degree Planbook*, in which the curriculum requirements and suggestions are treated in detail.

The student chapter of the Institute of Electrical and Electronic Engineers, a national professional society, is located in 222 Electrical Engineering.

# The departmental curriculum consists of:

Technical preparation: MATH 238, PHYS 123 (7 credits); specified electrical engineering courses: E E 331, 333, 351, 310, 371, 381, 383, 312 (30); electrical engineering electives (18); professional non-electrical engineering electives (4); free electives, in addition to college requirements (8); total-67.

A normal curriculum program, for the student who starts his or her major at the beginning of the third year, is shown below. The department recommends, however, that those students able to do so should start their major programs during the sophomore year with one or more of 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.

The total of free elective credits is 21. These electives can be the key to realization of the student's individual educational goals and should be selected carefully as part of an educational plan. In some cases, the electives are taken in technical fields, but the opportunity exists
for cultural enrichment or for pursuit of other areas of particular interest to the student.

It is possible, but not required, that a student specialize in a particular subarea of electrical engineering. The student is urged to consult with faculty advisers in a particular field if he or she wishes to specialize. Students who plan to continue into graduate studies should consult with the graduate adviser well before completion of their undergraduate programs.

#### Graduate Programs

Graduate Program Adviser R. W. Clark

Students who intend to work toward advanced degrees must apply for admission to the Graduate School and must meet the requirements outlined in the "Graduate Study" section of this catalog.

Although most graduate students in electrical engineering have received their bachelor's degree training in the same area, students from other physical sciences or from mathematics often are able to pursue graduate study in electrical engineering with little difficulty. 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

A total of 45 credits, of which 36 are in course work and 9 are for a thesis, are required for this degree. Course work usually is divided between electrical engineering and supporting courses in other fields in the ratio of approximately two to one.

Some students may wish to pursue a program toward the degree of Master of Science in Engineering, 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.

Adjunct Faculty Selinker

Courses offered by the department fall into three areas: the humanities, the social sciences, and scientific and technical communication.

#### **Humanities and Social Sciences**

All HSS courses in the humanities and social sciences are appropriate for fulfilling the College of 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 HSS 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, Germanic languages and literature, history,

#### ENGINEERING

humanities, Institute for Comparative and Foreign Area Studies, music, Near Eastern languages and literature, philosophy, Romance languages and literature, Scandinavian languages and literature, Slavic languages and literature, and speech.

#### Social Sciences Area

Architecture, urban planning, anthropology, archaeology, communications, economics, geography, history, 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, 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 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 HSS 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 earn a Bachelor of Science degree in the college with a program in scientific and technical communication.

## 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.

All inquiries concerning the industrial engineering program should be addressed to the industrial engineering adviser in care of the Department of Mechanical Engineering.

#### Undergraduate Program

Bachelor of Science in Industrial Engineering Degree

The Bachelor of Science in Industrial Engineering degree consists of a regular four-year course of study in an engineering department that offers a full curriculum, supplemented by an additional 45 credits as described below. A basic knowledge of statistics and computer programming is required for these courses. The program takes advantage of interaction with local industries to provide valuable practical experience in the application of theory. A student may pursue the degree concurrently with the first engineering degree, but must consult with an adviser about the program.

The departmental curriculum consists of:

M E 410, Engineering Administration (3 credits); M E 411, Engineering Economy (3); M E 412, Industrial Cost Analysis (4); M E 413, Engineering Operations Research (4); M E 415, Statistical Analysis of Engineering Measurements (3); M E 417, Work Systems Design (4) or M E 418, Work Simplification (2); M E 419, Work Environment Design (3); M E 420, Quantitative Analysis of Industrial Processes (4); School of Business Administration electives (6); electives (11); total—45.

### **Graduate Study**

Graduate studies specializing in the industrial engineering area may be undertaken, with the degree of Master of Science in Engineering being awarded upon satisfactory completion of 30 credits in course work and a 9-credit thesis. Students who intend to work toward this advanced degree must obtain admission to the Graduate School. By consultation with the industrial engineering adviser, each applicant's academic program is tailored to the individual, but course work must include a basic course in management, operations research, accounting, and statistics.

## Interdisciplinary Engineering Studies Program

#### Advising Center 111 General Engineering

Preparation for many career opportunities is best achieved through interdisciplinary engineering studies. For students with such interests the Interdisciplinary Engineering Studies Program offers an opportunity to construct individual curricula designed to fill their particular educational goals. Two types of curricula are available for this purpose: the professional program, leading to the degree of Bachelor of Science in Engineering, and the nonprofessional program, culminating in the degree of Bachelor of Science.

A student in these programs does not join an engineering department. Instead, the Engineering Advising Center provides a base for his records and initial advising. At the time he or she develops a personal interdisciplinary curriculum that must be approved by the Interdisciplinary Engineering Studies Committee, the student is assigned, when possible, to a faculty adviser with interests paralleling those of the student. Students are urged to contact the advising center for information on established procedures and guidelines for entry into the nondepartmental B.S.E. and B.S. programs.

#### Bachelor of Science in Engineering Degree

A student must meet all college requirements for a bachelor's degree as specified earlier in this catalog in order to obtain a B.S.E. degree. These consist of 120 credits divided among mathematics, natural sciences, functional techniques, engineering sciences, humanities, and social sciences. The minimum credit requirement for graduation is 180 credits, and there is no technical preparation requirement. The student should select the remaining 60 credits to provide a Program of Study consistent with his or her career objectives. The program should include 30 credits of at least 300-level engineering courses. The remaining 30 credits may be chosen from any University offering in engineering, mathematics, or the natural sciences, but at least half of these courses must be of at least the 300 level. Courses elected in this 60-credit category should provide a logical sequence of course work aimed at the desired goal of the student.

Two different uses of the B.S.E. degree are available:

1. Nondepartmental, but semiformalized B.S.E. degree programs in bioengineering, computer science, engineering acoustics, engineering physics, environmental engineering, mineral resources, nuclear engineering, ocean engineering, and others that may evolve.

2. Individually designed B.S.E. programs proposed by students whose interests are not met by department or program offerings.

Students usually enter the program after completing 90 credits, but planning should start early in the first two years. A student must complete a minimum of 30 credits after being admitted to the Interdisciplinary Engineering Studies Program before he or she may be awarded a B.S.E. degree.

#### Bachelor of Science Degree

The nonprofessional Bachelor of Science degree provides even greater flexibility than does the Bachelor of Science in Engineering degree. It is a good base for professional studies in law, medicine, or business, as well as in other fields, such as technical writing, engineering sales, or environmental studies.

To obtain a B.S. degree, a student must satisfy the same college requirements (120 credits) specified for the B.S.E. degree. The minimum credit requirement for graduation is 180 credits, and there is no technical preparation requirement. The student should select the remaining 60 credits to provide a Program of Study consistent with his or her career objectives. Of these 60 credits, at least 35 credits must be selected from engineering, science, or mathematics courses numbered 300 or above, and at least 25 of these 35 credits must be in engineering courses. The remaining 25 credits may be selected from among any courses offered by the University.

## MECHANICAL ENGINEERING

143 Mechanical Engineering

Mechanical engineering is the branch of engineering that is broadly concerned with energy, including its transformation from one form to another, its transmission, and its utilization. Mechanical engineers conceive, plan, design, and direct the manufacture, distribution, and operation of a wide variety of devices, machines, and systems, including complex man-machine systems, for energy conversion, environmental control, materials processing, transportation, materials handling, and other purposes. They must have a thorough grasp of the fundamentals of the engineering sciences, along with such skills as computer and graphic communication techniques.



A balance between engineering practice and a grasp of fundamentals is emphasized, so that young engineers can contribute when they begin their careers and, at the same time, have the background they will need for a lifetime of professional growth. Mechanical engineers are engaged in all the engineering functions, including creative design, applied research, development, and management.

#### Faculty

Morris E. Childs, Chairman; Adee, Alexander, Anderson, Balise, Bodoia, Bunney, Chalk, Chalupnik, Clark, Collins, Corlett, Crain, Daly, Day, Depew, Drui, Emery, Firey, Ford, Galle, Gessner, Gray, Guidon, Holt, Huntsman, Jorgensen, Kieling, Kippenhan, Kobayashi, Love, Marshall, McFeron, McIntyre (emeritus), McMinn (emeritus), Merchant, Messer, Mills, Morrison, Murphy, Osborn, Roberts, Sandwith, Schaller (emeritus), Sherrer, Taggart, Vesper, Vlases, Waibler, Walker, Wolak.

The department has an advising staff of regular faculty members, available in the Mechanical Engineering advising office. The advising staff is headed by the graduate program adviser and the undergraduate coordinating adviser, to whom inquiries should be directed.

#### **Undergraduate Program**

#### **Bachelor of Science in Mechanical Engineering Degree**

The Department of Mechanical Engineering requires that MATH 238, Elements of Differential Equations, and ENGR 180, Engineering Statics, be included in the engineering college program as technical preparation for departmental courses. ENGR 170, Fundamentals of Materials Science, and ENGR 141, Computer Applications to Engineering Problems I, are strongly recommended. MATH 327, Advanced Calculus, or MATH 205, Elementary Linear Algebra, should be taken in fulfilling the mathematics requirement. Students may begin mechanical engineering courses as soon as they have completed ENGR 180 and MATH 126 or their equivalents. Satisfaction of the minimum professional engineering requirements results from completion of the listed courses plus three courses in one of three options -energy and fluids, materials and processes, or systems and dynamics. A total of 180 applicable credits is required for graduation.

#### THIRD YEAR

First quarter: M E 320 (4 credits)\*, M E 352 (3), M E 365 (4) † electives (4); total—15. Second quarter: M E 323 (4), M E 343 (4), M E 373 (4), electives (3); total

\* Students who have completed ENGR 260 will not take M E 320. † Students who have completed ENGR 230 will not take M E 365. ---15. Third quarter: M E 304 (3) M E 333 (4), M E 353 (3), M E 394 (1), electives (4); total---15.

#### FOURTH YEAR

First quarter: M E 480 (4 credits), M E 495 (4), mechanical engineering option (3), electives (4); total—15. Second quarter: M E 469 (3), E E 306 (5), mechanical engineering option (3), electives (4); total—15. Third quarter: mechanical engineering option (3), electives (12); total—15.

#### Graduate Programs

Graduate Program Adviser

A. S. Kobayashi

#### Master of Science in Mechanical Engineering and Doctor of Philosophy Degrees

Master of Science in Mechanical Engineering and Doctor of Philosophy degree programs in mechanical engineering provide a balanced combination of formal instruction and independent research or design experience. Flexible requirements for course work provide opportunities for a broad scientific and professional background and for specialty training. Fields with active programs of teaching and research include heat transfer, fluid mechanics, experimental mechanics, fracture mechanics, acoustics, controls, combustion systems, dynamics and vibration, behavior of engineering materials, manufacturing processes, and fire research.

Financial aid is offered to full-time graduate students, the amount depending upon the availability of funds. This aid may be in the form of research assistantships from sponsored programs, traineeships and fellowships, or teaching assistantships.

Students who desire to work toward a graduate degree must fulfill admission requirements for the Graduate School (see the "Graduate Study" section of this catalog). A Master of Science in Mechanical Engineering degree requires a 9-credit thesis and a minimum of 30 credits of approved course work. The requirements for the Doctor of Philosophy degree include completion of an approved Program of Study and a research program that makes a definite contribution to knowledge.

### MINING, METALLURGICAL, AND CERAMIC ENGINEERING 318 Roberts

The department offers courses leading to the degrees of Bachelor of Science in Metallurgical Engineering; Bachelor of Science in Ceramic Engineering; Master of Science in Metallurgical Engineering or in Ceramic Engineering; and Master of Science and Doctor of Philosophy in the fields of metallurgy and ceramics.

#### Faculty

Douglas H. Polonis, Chairman; Anderson, Archbold, Brien, Campbell, DeWerd, 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 62 credits, plus 8 credits of technical preparation courses, including HSS 300 and E E 306. Recommended is the selection of CHEM 350 and 351, Elementary Physical Chemistry, for satisfying part of the engineering science requirements.

Although no formal work-study program is available in ceramic engineering, assistance is offered in obtaining industrial experience during the summer vacations following the second and third years.

#### THIRD YEAR

First quarter: CER E  $300^*$  (5 credits), CER E 301 (4), CER E 306 (1), MET E 322 (3), electives (3); total— 15. Second quarter: CER E 302 (4), CER E 311 (3), CER E 312 (4), CER E 322 (3), electives (3); total— 17. Third quarter: CER E 303 (5), CER E 313 (4), CER E 323 (3), CER E 499 (1), electives (3); total— 16.

#### FOURTH YEAR

First quarter: CER E 307 (1 credit), CER E 401 (3), CER E 411 (4), CER E 441 (1), CER E 499 (2), electives (5); total—16. Second quarter: CER E 402 (2), CER E 442 (1), CER E 470 (3), CER E 499 (2), electives (7); total—15. Third quarter: CER E 403 (3), CER E 443 (1), electives (12); total—16.

#### **Graduate Programs**

Students may select courses and research in accordance with their special interests and objectives. Graduate \* Not required if student has completed CER E 198, 202, 203. work is mostly concerned with advanced physical sciences as applied to ceramics; however, courses that prepare for plant operation and management also may be selected. Eligible to work for the master's degree are graduates of accredited ceramic engineering curricula and graduates of other accredited engineering curricula who complete the basic undergraduate courses in ceramic engineering and in science.

#### Master of Science in Ceramic Engineering Degree

A bachelor's degree in engineering is required. If field of specialization is not ceramic engineering, some background courses also are required.

A total of 39 credits, including 9 credits of suitable thesis research, and a comprehensive oral examination also are required.

#### Master of Science (Ceramics-Metallurgy) Degree

Students with undergraduate majors in science, particularly chemistry or physics, may work for this degree after completing basic undergraduate courses in ceramics. The same academic and thesis program is required for this degree as is described for the degree of Master of Science in Ceramic Engineering.

#### **Doctor of Philosophy Degree**

Students who have completed at least one year of satisfactory graduate study may request an examination to determine their eligibility for work leading toward the Doctor of Philosophy degree. Accepted students must complete an approved Program of Study and a research program that makes a definite contribution to the knowledge of the field.

#### METALLURGICAL ENGINEERING Division Head

#### D. H. Polonis

The field of metallurgical engineering is concerned with the processing, fabrication, and utilization of metals, alloys, and other engineering materials. Extractive metallurgy relates to the processing and refining of metals and their compounds. Physical metallurgy is concerned with the structure and properties of materials, the development of new materials with improved properties, and the application and performance of materials in modern engineering systems and design. Both of these aspects of metallurgical engineering strongly overlap modern physics, mathematics, chemistry, manufacturing, and economics.

#### **Undergraduate Program**

#### Bachelor of Science in Metallurgical Engineering Degree

The list of courses recommended for majors in metallurgy should be considered in planning schedules that



satisfy the engineering science and the natural science requirements during the first two years.

In the fourth year, students have an opportunity to plan their programs in accordance with individual goals and interests. The technical electives in the senior year must include at least 18 credits of senior-level courses in metallurgical engineering, exclusive of MET E 499.

Electives in labor relations, business administration, mechanical engineering, and economics are recommended for students interested in plant operation and administration.

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: MET E 468 (1), technical electives (9), electives (5); total—15. Third quarter: MET E 468 (1), technical electives (9), electives (5); total—15.

#### **Graduate Programs**

#### Master of Science in Metallurgical Engineering Degree

A total of 39 credits, including 30 credits in course work, 9 credits for a thesis, and an oral examination are required for this degree. Prospective candidates may select courses in accordance with their special interests and objectives.

Master's degree work is mostly concerned with advanced materials science as applied to physical metallurgy, extractive metallurgy, or mineral processing. Courses that prepare for plant operation and management also may be selected. Eligible to work for this degree are graduates of accredited metallurgical engineering curricula and graduates of other engineering curricula who complete the basic undergraduate courses in metallurgical engineering.

#### Master of Science (Ceramics-Metallurgy) Degree

Students with undergraduate majors in science, particularly chemistry or physics, may work for this degree after completing basic undergraduate courses in metallurgy or equivalent.

#### Doctor of Philosophy Degree

Students who have completed one year of graduate work may request an examination to determine whether or not the faculty will advise proceeding to the General Examination for the degree of Doctor of Philosophy. A critical examination of the applicant's record, recommendations, and proposed course of study will be pertinent to this decision. In addition to course work, each student is required to prepare for a General Examination on a list of subjects selected by a Supervisory Committee. The General Examinations are sufficiently comprehensive to demonstrate the student's ability to deal with broad aspects of materials science, as well as with a specialized subject area. Proficiency in basic research is of paramount importance. Each prospective candidate is required to present a written dissertation that makes an original and independent contribution to knowledge.

#### MINING ENGINEERING Division Head Donald L. Anderson

As approved by the Board of Regents on January 21, 1972, the degree programs of Bachelor of Science and Master of Science in Mining Engineering are being discontinued over a period extending until December 16, 1976. Students who entered the University before June, 1972, and will complete their degree requirements before December 16, 1976, will continue to be accommodated. Transfer students who can expect to complete their degree requirements by December 16, 1976, will also be accepted into the program.

Information and personal assistance in planning a curriculum leading to a degree in mining can be obtained by writing to the Division Head, Prof. Donald Anderson, or by telephoning 543–2611 or 543–2600.

It is anticipated that undergraduate courses related to mineral natural resources and the mineral industries will continue to be offered as electives for students in the natural sciences and engineering. Through use of the new and flexible program leading to the degree of Bachelor of Science in Engineering, students can acquire the background in the mineral resource field to seek employment in the industry or to become qualified to continue graduate studies in mining engineering at another institution.

### NUCLEAR ENGINEERING

303 Benson

Nuclear engineering is concerned with the release, control, and utilization of all forms of energy from nuclear sources. The discipline was created more than twentyfive 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, Chairman and graduate adviser; Albrecht, Chalk, Garlid, McCormick, Robkin, Vlases, Woodruff.

#### Affiliate Faculty

Ambrose, Clayton, Hofmann, Schmid, 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 bachelor's degree level; and (3) a solid foundation in an area of engineering that complements nuclear engineering as a discipline.

The Department of Nuclear Engineering requires that PHYS 123, Waves; MATH 238, Elements of Differential Equations; and CHE 330, Transport Processes I, be included in the engineering college program as technical preparation for department courses. Mathematics and Physics Requirements: (18 credits minimum)—MATH 324, 325, 326, Advanced Calculus I, II, III; MATH 427, 428, 429, Topics in Applied Analysis; MATH 438, Principles of Differential Equations; MATH 464, 465, Numerical Analysis I, II; PHYS 324, Quantum Mechanics; PHYS 327, Introduction to Nuclear Physics.

Nuclear Technology Requirements: (30 credits minimum)—ENGR 305, Environmental Radioactivity; ENGR 307, The Energy Question; ENGR 308, The Energy Question Laboratory; NUC E 400 (4), 477 (3), 485 (3), 486 (3), 488 (4), 489 (3), 498 (1-6, maximum 6), 499 (1-6, maximum 6).

Nontechnical Elective Requirements: (12 credits minimum)—It is recommended that students plan a series of courses that consider the legal, political, and economic aspects of directing technology in the service of mankind.

Complementary Engineering Studies: (30 credits minimum)—This sequence of courses is prepared by the student and must be approved by the Interdisciplinary Engineering Studies Task Group and the Chairman of the Department of Nuclear Engineering. Fields of study that provide a sound complement to the disciplines of nuclear engineering include, but are not limited to:

Chemical systems: In this area, emphasis is placed on the development and application of processes and equipment such as those used in the nuclear fuel cycles in which matter is treated to induce a change of state (or phase), energy content, or chemical composition.

Electrical/electronic systems: This area is concerned with the control of electricity and the electrical properties of materials with applications in system theory, computers, physical electronics, and instrumentation and control.

Environmental engineering: In this area, the student obtains an understanding of the growing problems of air, water, and land pollution. This includes the quality and quantity of present production of wastes, their known environmental effect, practical methods of control, and prospects for the future.

Materials technology: This area is oriented toward the materials sciences, with emphasis being placed on atomic, molecular, and crystalline structure, the physical properties of solids, thermodynamic properties of materials, reactions, and mechanical behavior. The preparation, properties, and applications of metals and alloys in various environments also are considered.



Thermal-hydraulic systems: This area provides the student with a strong background in thermodynamics, fluid flow, and heat transfer. It provides the necessary preparation for advanced work in the design and analysis of thermal-hydraulic systems in nuclear steamsupply systems, and nuclear reactor safety analysis.

#### **Graduate Programs**

Graduate Program Adviser

A. L. Babb

### Master of Science in Nuclear Engineering Degree

Students who have earned a bachelor's degree in engineering, mathematics, chemistry, or physics are eligible for admission. Strong foundation in atomic and nuclear physics and in advanced mathematical analysis recommended.

A total of 39 credits required: 30 in formal course work, including basic courses in nuclear reactor theory, nuclear engineering laboratory, nuclear reactor engineering, nuclear engineering seminars including at least 6 credits in nuclear engineering courses numbered 530 and above, and at least 6 credits in an elective course sequence in mathematics, physics, or engineering science; 9 credits in a thesis project; foreign language not required.

#### **Doctor of Philosophy Degree**

Lectures, seminars, informal discussion, independent study, and research enable the student to become expert and to make original contributions in his or her chosen field. Approximately one full year of course work beyond the master's degree is usually essential. Courses are selected on the basis of a student's interest and background and may be chosen from offerings of other departments, as well as from the Department of Nuclear Engineering. Students may specialize in several areas, each representing an important aspect of nuclear technology:

Neutronic Analysis of Nuclear Systems: Primarily concerned with the analysis of fission reactors and other neutronic systems from a fundamental point of view. Includes topics such as neutron transport theory; the slowing down, thermalization, and diffraction of neutrons; fast reactor systems; criticality; and mathematical and computational methods.

Nuclear System Dynamics: Emphasis on the time-dependent behavior of reactors and on other nuclear engineering systems. Stability and control of nuclear reactors, noise analysis, and pulsed neutron source analysis included.

Thermonuclear Systems and Plasmas: Includes the study of plasmas and their behavior, explores the problems and promises associated with fusion reactors. Emphasis on fundamental characteristics of plasmas, both theoretical and experimental work, is possible.

Engineering Analysis of Nuclear Systems: A specialization concerned with the engineering aspects of nuclear systems. Some possible areas: Thermal-hydraulicsconcerned 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 Ph.D. degree.

A prospective candidate for the degree is expected to conduct an original and independent investigation in one of the fields of nuclear engineering. The dissertation must be a significant contribution to knowledge.

Final Examination: The student orally presents and, defends the results of his or her investigation.

## FISHERIES

#### Dean

Douglas G. Chapman 206 Fisheries

#### Faculty

Bell, Bevan, Bledsoe, Bonham, Brannon, Brown, Burgner, Chapman, Chew, DeLacy, Donaldson (emeritus), Fletcher, Gallucci, Held, Hershberger, Jayne, Johnson, Kasahara, LeGore, Liston, Lynch, Matches, Mathews, Mathisen, McCaughran, Miller, Nakatani, Nevissi, Pearson, Pigott, Rogers, Royce, Salo, Schell, Seymour, Smith, Stober, Taub, Thorne, Van Cleve, Welander, Whitney, Wissmar.

#### **Affiliate Faculty**

Bourne, D'Aoust, Eberhardt, Halver, Hodgins, Jones, Joseph, Joyner, Katz, Loosanoff, Olsen, Pereyra, Rucker, Skud, Southward, Sparks, Steinberg, Stout, Thompson, Tillman, Utter, Weber, Wedemeyer, Woelke, Wydoski.

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-ofstate and foreign students, particularly at the graduate level.

The College of Fisheries offers courses leading to the degrees of Bachelor of Science in Fisheries, Bachelor of Science with a major in fisheries, Bachelor of Science with a major in food science, Master of Science, and Doctor of Philosophy. The college programs are designed to provide both the scientific training and the professional competency necessary for graduates to satisfy the various needs of their chosen fields.

#### **Fisheries Research Institute**

#### Faculty

Robert L. Burgner, Director; Roy E. Nakatani, Assistant Director; Lord, Mathisen, Rogers, Salo, Smith, Stober, Thorne, Wissmar.

#### **Research Staff**

Cederholm, Dawson, Donnelly, Gilbertson, Hartt, Leistikow, Opperman, Parr, Pease, Poe, Roger, Simenstad, Snyder, Tyler.

The Fisheries Research Institute is a research branch of the College of Fisheries. Many of the college's grants and contracts in the field of fishery biology are handled by the institute under the direction of both teaching and research faculty. The research programs provide practical training opportunities for fisheries students as well as support and thesis research under the guidance of the faculty with the assistance of the technical staff. The research projects in the institute provide a wide spectrum of opportunities for thesis research, and financial support for these activities comes from diverse sources.

Research on Alaskan and Washington salmon runs is conducted under various industry, state, and federal contracts. Currently, the principal salmon studies are: population dynamics and ecology of lakes producing sockeye salmon; migration and abundance of salmon on the high seas; yield forecast; ecology of stream nursery areas; regulation for optimum yield; spawning, channel rearing, and behavior of chum salmon; effects of altered environmental conditions in freshwater and estuaries; and estuarine pen-rearing of salmon. Much of this work on salmon is important to the United States section of the International North Pacific Fisheries Commission, and members of the institute staff participate in the meetings of the commission. Research related to the impact of man's activities on the quality of our environment includes projects on effects of logging, effects of underground nuclear tests, toxic effects of salmon cannery wastes, and ecological impacts of nuclear power plants, as well as studies of effects of dams and equalizing reservoirs. Under the National Science Foundation, Analysis of Ecosystems Program, the institute is participating with other departments in the University in an 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, Kiket Island, and Fern Lake. The program and aspects of estuarine pen-rearing of salmon and trout are directed toward assisting development of commercial aquaculture, as well as sport fishing resources.

Another major program of activities is in the application of acoustical techniques to the assessment of fish stocks in lake and marine environments.

The institute maintains headquarters and laboratory facilities on the University campus and semipermanent field stations at five locations in Alaska. The campus headquarters and the Big Beef station are used for work in Washington. A large amount of field and laboratory equipment is available together with an extensive collection of fishery records from the Pacific Northwest and Alaska. Provision is made to conduct research on fishery problems in collaboration with other colleges, schools, and departments of the University, especially Economics, Engineering, Law, and Oceanography.

The *Kumtuks*, a ninety-nine-foot floating physiology laboratory, is used in Puget Sound and nearby waters for the study of biochemistry and physiology of fish. It contains large well-equipped laboratories, aquaria, and living quarters for several students and staff.

The motor vessel *Malka*, 'thirty-eight feet long, is used for inshore oceanographic and biological work in Washington and Alaska. It is equipped with a small laboratory and with winches for handling specialized fishing or sampling gear.

The thirty-two-foot *lliamna*, 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.

**FISHERIES** 



#### Institute for Food Science and Technology Faculty

John Liston, Director; Matches, Pigott, Taub.

#### **Research Staff**

Hung, Palmer, Read, Shenouda.

The Institute for Food Science and Technology incorporates the teaching, research, and advising programs in food science into a single unit. The teaching program includes undergraduate and graduate instruction described elsewhere in this catalog.

The research activities within the institute are concentrated in food microbiology, food safety, radiation processing of foods and seeds, food process engineering, biochemical processes in foods, marine microbiology, aquatic microsystems, seafood technology, and nutrition. Active within each of these areas is at least one specific research project usually funded by federally derived grants from agencies such as the Public Health Service, Atomic Energy Commission, and National Science Foundation. These projects provide opportunities for research training for both undergraduate and graduate students in food science.

Industrial research is carried out on an *ad hoc* basis by the institute at the request of food companies. Such research, which is paid for by the companies, is encouraged.

Advice and consultation, particularly on problems of seafood technology, are provided under formal and informal arrangements. The principal formal program in this area is operated jointly with the University's Division of Marine Resources. A seafood specialist, qualified at the Master of Science degree level and with several years of industrial experience, is employed to maintain contact with individuals and companies in the seafood business and to assist them, as well as other interested persons, in resolving problems associated with seafoods and seafood processing.

A center of information in seafood technology is maintained in the institute, and questions from industry or the public are frequently answered directly from the information in this source, which is kept current. Usually working with the seafood specialist, the institute offers workshops and other such programs from time to time for the seafood industry. Workshops on more general food science topics are also offered by the institute. The involvement of students in these industry-contact programs is encouraged to the greatest extent possible, because it provides them with excellent experience in industrial conditions and operations.

#### Laboratory of Radiation Ecology Faculty

Allyn H. Seymour, Director; Nevissi, Schell, Welander.

#### **Research Staff**

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Johnson, Jokela, Lusk, McAlpin, Nelson, Vick.

The Laboratory of Radiation Ecology undertakes research programs related to contaminants in marine and freshwater environments, including man-produced radionuclides, naturally occurring radionuclides, and heavy metals. Interdisciplinary in nature, the programs involve a combination of field and laboratory studies conducted by faculty and graduate students from the College of Fisheries and, to some extent, from other colleges and departments on the campus.

The laboratory was established in 1943 as the Applied Fisheries Laboratory and later was renamed the Laboratory of Radiation Ecology. The original program focused attention on the effects of X-rays on salmon, trout, and other aquatic organisms for the purpose of evaluating the impact of the Hanford plutonium production reactors on the fishery resource of the Columbia River. The field studies began with a radiobiological survey at Bikini Atoll in 1946 and have continued to the present. The locations of other field studies have included many areas of the Central Pacific, Cape Thomson in the Arctic, Amchitka in the Aleutian Islands, and the coastal and inland waters of Washington. The field programs are complemented by research projects in the laboratory. Originally, most of the field work was related to biological studies of nuclear detonation or reactor-produced radionuclides in marine environments remote from the University, but in recent years, studies of naturally occurring radionuclides and heavy metals in Washington waters have been also undertaken. The laboratory has excellent equipment and facilities for the measurement and identification of alpha-, beta-, and gamma-emitting radionuclides and of heavy metals in animal, plant, soil, sediment, water, and air samples.

The research programs are conducted by the core staff, which is strongly supported by graduate students, some of whom select thesis research projects related to the laboratory's research programs. Examples of recent thesis projects include the following subjects: effects of ionizing radiation plus temperature on the eggs and larvae of oysters; effects of tritium on the development and behavior of guppies; effects of radiation and temperature on primary productivity; the use of radionuclides to determine the biological half-life of iron in rainbow trout; and the distribution of lead and mercury in the biota, water, and sediments of Lake Washington. Other current research programs of the laboratory are the study of heavy metals in the Puget Sound Basin; naturally occurring lead-210 and polonium-210 in the water, biota, and sediments of Washington's inshore and coastal waters; the biogeochemistry of transuranic elements at Bikini Atoll; radioecological studies at Amchitka Island related to the containment of radionuclides produced by underground nuclear detonations; radioecological studies at Eniwetok and Bikini Atolls related to the resettlement of the native people; and the distribution of Hanford-produced radionuclides in the water and biota of Washington's coastal waters.

#### Washington Cooperative Fishery Unit

Faculty

Richard R. Whitney, Unit Leader; Gilbert B. Pauley, Assistant Unit Leader.

Cooperators in the Washington Cooperative Fishery Unit are the Department of the Interior's Bureau of Sport Fisheries and Wildlife, the Washington Department of Fisheries, the Washington Department of Game, and the Uiversity of Washington. In addition, projects are being funded by the National Science Foundation, the Bureau of Reclamation, and by the Washington Fly Fishing Club. The funds are used by staff of the unit and graduate students to carry out research projects dealing with recreational fisheries. Currently under way are studies of: effects of flow and temperature on timing of steelhead runs on coastal streams; diseases and parasites of trout; benthic and littoral fishes in Lake Washington, particularly as they respond to human influences; and effects of cedar leachate on fish and aquatic invertebrates, as well as studies generally related to under-utilized fishes potentially important as sport fishes. In these studies, the unit's staff often works with students interested in credit for undergraduate research (FISH 499).

Offices of the Cooperative Fishery Unit are in 106 Fisheries Center. Facilities of the cooperating agencies can be made available for use by students through the unit.

## RELATED PROGRAMS

Programs in the College of Fisheries benefit from the fact that a regional office and laboratories of the National Marine Fisheries Service, as well as branches of the Bureau of Sport Fisheries and Wildlife, are located in the city of Seattle. In addition, the headquarters and research staff of the International Pacific Halibut Commission are located on the campus. The Washington State Department of Fisheries maintains offices in the Fisheries Center, and close contacts also exist between the college and the research staff of both the Department of Fisheries and the Game Department in Olympia. Many of the senior research members of these organizations, as well as many from industry, are lecturers or affiliate faculty in the college.

The College of Fisheries is actively engaged in waterresource management activities through the participation of its faculty in the interdisciplinary programs. The college is represented in the State of Washington Water Research Center.

The newly established Institute for Marine Studies will provide coordination between the diverse marine activities throughout the University. It also will develop interdisciplinary programs relating marine sciences to social sciences and other disciplines. As these new programs are developed, students will find many additional options open to them, although any graduate student already may develop his own interdisciplinary program and seek its approval through the Graduate School. The Division of Marine Resources supervises the University's Sea Grant program, which provides support for research and extension services in problems of the marine environment, particularly fisheries.

## INTERCOLLEGE PROGRAMS WITH THE COLLEGE OF FOREST RESOURCES

### Center for Quantitative Science in Forestry, Fisheries, and Wildlife

Faculty

Benjamin A. Jayne, Director; Bare, Bevan, Bledsoe, Chapman, Dugdale, Fletcher, Gallucci, Hatheway, Kelley, Male, Mathews, McCaughran, Schreuder, Turnbull, Walsh, Winter.

#### **Research Staff**

Brown, Buss, Gales.

The Center for Quantitative Science in Forestry, Fisheries, and Wildlife is an intercollege academic unit sponsored by the College of Forest Resources and the College of Fisheries. The center offers a broad program in applied mathematics and in mathematical services directed principally to the two resource colleges, as well as other life science departments of the University. The applied mathematics program of the Center for Quantitative Science is concerned with quantitative descriptions of the management of both aquatic and terrestrial ecosystems. The center's program consists of six areas of course offerings. These areas include computer programming with particular emphasis on problems of the management of living resources; quantitative ecology, including population, community, and systems ecology;



physical processes in biological systems, emphasizing mass and energy transport in ecosystems; operations research, with particular focus on the utilization of renewable resources; applied statistics, with special emphasis on statistical inference and experimental design for the biological sciences; and applied analysis consisting of differential mathematics applied to the life sciences. Courses in each of the six areas are interrelated in a way that meets a wide range of student interests and needs.

The faculty of the center participated in the research activities of several academic units of the University. These include, in addition to the two resource colleges, the College of Engineering, the College of Arts and Sciences, including the departments of Economics, Geography, and Oceanography, and the graduate schools of Business Administration and Public Affairs.

Both the teaching and the research programs of the center are designed to bring together living systems, mathematics, and the computer for purposes of description and management. Particular emphasis is placed upon the use of the computer for quantitative descriptions of both terrestrial and aquatic ecosystems and resource management. Computerization makes possible a study of the impact of exploratory management policies on simulated resource systems imbedded in backgrounds of interrelated physical, biological, and economic activities, and under numerous institutional constraints. Such computer-based models have been successfully employed in the management of forest stands, control of insect pests, management of fish and aquatic mammal stocks, and preparations of the descriptions of complex ecosystems.

#### Wildlife Science Program

#### Committee

Donald E. Bevan, Chairman; McCaughran, Salo, Scott, Taber.

The colleges of Fisheries and Forest Resources, through the Wildlife Science Committee, jointly administer an undergraduate degree program in wildlife science. This interdisciplinary program requires training in biological and quantitative science, as well as work in fisheries and forest resources. Students interested in the aquatic aspect of wildlife will register in the College of Fisheries. The student who obtains a Bachelor of Science degree with a major in wildlife science will be able to apply his training to management of wildlife resources and the related environment, or he may proceed to do graduate work for advanced management or to fill a research position. An undergraduate interested in this field may prefer to major in a broader area (fisheries, forest resources) and to select an elective concentration in wildlife science. Additional information may be obtained from a member of the committee.

## COLLEGE FACILITIES AND SERVICES

The Fisheries Center on the Lake Washington ship canal contains classrooms, laboratories, and general facilities, as well as several research organizations. Located in the Oceanography Teaching Building nearby is the Fisheries-Oceanography Library, a branch library of research materials in fisheries, food science, oceanography, and wildlife science. The collection of fishes and shellfish maintained by the college for research and teaching purposes contains more than three hundred thousand cataloged specimens. These are mainly North Pacific marine fishes and northwestern freshwater fishes. However, the collection also includes extensive material from the Philippine Islands and the South Pacific, as well as representative collections from other parts of the world.

An annual run of several thousand salmon has been developed and is maintained at the college by the release of thousands of fingerlings each spring. Returning adults utilize a fish ladder to enter the college's experimental fish hatchery. The run is the basis for both instruction and research on the life cycle of Pacific salmon. In progress are long-term studies on the effects of chronic irradiation of salmon during embryonic development, on dietary requirements of the young fish, and on the selective breeding of both salmon and rainbow trout. A saltwater aquarium also is maintained by the college. Cold or warm recirculated seawater may be supplied to a battery of aquaria, as well as to a unique two thousand-gallon annular tank.

Other laboratories provide for the study of the physiology and behavior of fish and of the effects of pollutants on fish. These include a separate room containing troughs and tanks in which water temperature may be maintained at various levels. Physiological facilities include equipment for surgical procedures and for biochemical analysis of body fluids from both freshwater and marine fish.

The College of Fisheries and the Fisheries Research Institute maintain an extensive library of computer programs for processing biological data. The Fisheries Analysis Center of the college provides service in programming and card punching, as well as assistance with the use of the computer; the college maintains a 200 User Terminal to provide ready access to the larger computers in the Computer Center, CDC 6400 and Burroughs B5500. With the cooperation of a multidisciplinary group of national and international experts, faculty and staff of the college and of the Center for Quantitative Science have developed a comprehensive set of resource-management teaching games. The games are being employed as "Link trainers" in a number of courses. They supplement traditional methods by providing students with opportunities to experience management decision making and to test their analytical skills on a variety of simulations of national resource-management problems.

A sixty-seven-foot diesel-powered boat, the Commando, is used for instruction and research in Lake Washington, Puget Sound, and the North Pacific Ocean. Capable of trawling to a depth of six thousand feet, it is equipped for other types of fishing undertaken in the North Pacific, as well as for handling a wide variety of experimental gear. The Commando has facilities for marine microbiological studies and for technological investigations at sea. These include freezers, other refrigeration equipment, and a small laboratory unit. Periodic training cruises introduce students to shipboard operations, including the use of various types of sampling equipment, and acquaint them with a diversity of marine habitats.

The headquarters of one of the Pacific Coast's largest fishing fleets is located within two miles of the campus. Besides serving as a base for the world-famous salmon and halibut fisheries, Puget Sound has extensive bottom fish, commercial oyster, clam, crab, and shrimp operations. Sport fishing, particularly for trout, is available in the Pacific Northwest's many lakes and streams, and the college takes full advantage of the proximity of these natural resources in research and teaching. A College of Fisheries field station at Big Beef Creek on Hood Canal provides additional opportunities for class field studies and research in stream and estuarine ecology. The stream contains established runs of chum and coho salmon and steelhead trout. Research facilities include a salmonid spawning channel, estuarine rearing ponds, and stream observation channels. Other field activities are undertaken at the college's Fern Lake station in Kitsap County, where special attention is given to limnology and to the influence of the watershed on the lake.

Food science facilities include separate well-equipped laboratories for food microbiology, food biochemistry, and food analysis. The food-processing and engineering laboratory complex is composed of several separate facilities that contain equipment for teaching and experimental work in thermal processing, including canning, plus the drying, smoking, and freezing of foods. A wide variety of low-temperature equipment and cold rooms is available.

A unique feature of the food science laboratories is the Cobalt-60 research food irradiator (Mark II). This radiation unit contains a source of about thirty thousand curies' strength. Food or other materials to be irradiated are loaded into metal containers, which are moved mechanically into proximity to the radiation source. Operational safety is ensured by a water shield, and the containers are designed to provide for temperature and atmosphere control during irradiation.

Facilities for graduate studies in nutrition, including experimental work with vertebrates and invertebrates, are provided in the Institute for Food Science and Technology laboratory and shipboard facilities, including simulated seabed equipment, pressure-bomb incubators, deep-sea sampling equipment, etc., are maintained in the Institute for Food Science and Technology for graduate studies in the field of marine microbiology.

In 1971, the University of Washington was named a Sea Grant institution under the national Sea Grant College and Program Act, which is administered by the National Oceanic and Atmospheric Administration. The College of Fisheries participates actively in this program, with research projects concerned with the living resource of the Northeastern Pacific and the changing environment of Puget Sound, with advisory services to industry, and with a variety of courses.

#### **Fisheries Club**

Since its formation by the students of the College of Fisheries in 1922, the Fisheries Club has been the center of extracurricular social and educational activities for the college students.

Monthly meetings offer varied programs that include speakers from the industry and motion pictures that deal with fisheries all over the world. In the past years, the students have organized the open house of the College of Fisheries. In addition, the club has an annual picnic, a steelhead derby, and other social gatherings, as well as a variety of other projects beneficial to members.

#### Undergraduate Programs Degrees Offered

Fisheries Science: Bachelor of Science in Fisheries and Bachelor of Science with a major in fisheries.



*Food Science:* Bachelor of Science with a major in food science.

#### High School Preparation

Although the College of Fisheries does not have specific high school requirements other than those of the University, students are urged to take intermediate algebra and trigonometry, because these are prerequisites for the first courses in mathematics included in all College of Fisheries curricula. If possible, students who plan to enter the college should complete these courses in addition to elementary algebra and plane geometry, which usually are the two units of college preparatory mathematics. The study of chemistry, physics, and biology in high school is useful preparation.

#### Admission

Admission as a Premajor: Students spend the equivalent of their first two years, or approximately 90 credits, as fisheries or food science premajors. At his or her option, a student admitted to the University of Washington may become a fisheries premajor by application to the college.

#### **Premajor Program**

Prior to becoming a fisheries or food science major, a student must complete the credits in the subjects shown below:

Fisheries Science: General biology (15 credits); general chemistry (10); organic chemistry (5); English (expository writing) (5); mathematics (algebra, calculus) (9); statistical methods (5); general economics (3); speech, public speaking (5); total—57.

Food Science: General biology (10 credits); general chemistry (14); qualitative and quantitative chemistry (8); organic chemistry (10); English (expository writing) (5); mathematics (algebra, calculus) (9); statistical methods (5); general physics (12); total—73.

FISH 101, courses in humanities, social sciences, physics, or in the use of computers are recommended for additional credits. The student must earn 10 credits in foreign-language study unless two units already have been taken in high school.

Students at the University of Washington may refer to subsequent pages in this catalog for the numbers of specific courses required or recommended for the fishery biology and food science curricula. Students at community colleges in Washington should consult the most recent Bulletin of Community College Transfer Programs. Students at other institutions should take equivalent courses.

#### Admission as a Fisheries or Food Science Major

After completing 75 credits, including requirements of the premajor program, a student may apply for admission to the College of Fisheries with major status. Application forms may be obtained from the college office.

When more students than can be accommodated apply, satisfaction of minimum admissions standards does not guarantee acceptance. Criteria of acceptance include grade-point average, appropriateness of completed course work, academic objectives, motivation, references, and personal interviews with advisers.

Minority and women students are urged to consider potential futures in this field. Literature on career opportunities is available in the college office. The college cooperates with the Educational Opportunity Program in giving special aid to students who have not received the usual educational advantages.

#### Advising

After receiving notification of admission and before registering, new students should visit or write to the College of Fisheries for help in planning their course programs. Academic and other counseling of fisheries students is given by faculty advisers in the College of Fisheries.

#### **Graduation Requirements**

Students who do not include two units of foreign language in their college preparatory programs are required to achieve equivalent competence in a foreign language as a graduation requirement. This requirement may be fulfilled by successful completion in the University of 10 credits of a foreign language or by passing an appropriate placement examination.

The University requires 180 academic credits for graduation, of which 36 must be taken in fisheries or food science. At least 60 of the 180 credits must be in upper-division courses, those numbered 300 and above. Advanced ROTC courses do not count toward upperdivision credit, and no more than 18 credits in advanced ROTC courses may be counted toward graduation. For graduation, a student must have a cumulative grade-point average of 2.00 in fisheries and food science courses and an overall average of 2.00 in all courses. Additional graduation requirements associated with specific degrees are given below.

Students who transfer from other institutions to the College of Fisheries are required to earn at least 10 credits in their major subject in this college.

#### **Financial Aid**

Through industrial and private scholarships, the college offers limited financial assistance to undergraduates and graduates. The *Handbook of Scholararships*, obtainable from the Office of Student Financial Aid, 170 Schmitz, lists available scholarships.

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#### Employment

The College of Fisheries maintains a file of both permanent and summer job opportunities for its students. Summer or part-time employment during the scholastic year is frequently available with the research organizations that are associated with the College of Fisheries on or near the campus or elsewhere in the Pacific Northwest. The Fisheries Research Institute usually hires students for summer work in the field and often has several part-time positions available during the school year. Similar work is available in the Washington State Department of Game, the Washington State Department of Fisheries, the United States National Marine Fisheries Service, the International Pacific Halibut Commission, the Laboratory of Radiation Ecology, the Oregon Fish Commission, the International Pacific Salmon Fisheries Commission, and the Alaska Department of Fisheries. Some of these jobs are located within the state of Washington, but many take students to Alaska or elsewhere in the United States. These agencies usually interview students at the College of Fisheries during Winter Quarter, seeking both permanent employees and summer-only employees. Fisheries students are encouraged to seek summer work in the field to gain valuable experience in fishery biology or in fisheries or food technology.

## FISHERIES SCIENCE

Adviser

Allyn H. Seymour 104 Fisheries

Bachelor's degrees require completion of a common core curriculum and no fewer than 36 credits in fisheries. The standard program includes the subjects listed below, or their equivalents.

#### Core Curriculum

Basic Science: (30 credits minimum) Biology, general— BIOL 101–102 (5–5) and BOT 113 or 220 (5, 5); or BIOL 210, 211, 212 (5, 5, 5). Chemistry, general— CHEM 140, 150, 151 (4, 4, 2). Chemistry, organic— CHEM 102 or 231, 232 (5, 3, 3).

Mathematics and Statistics: 9 credits minimum, beyond MATH 105, Elementary Functions (5). Mathematics (calculus)—MATH 124, 125 (5, 5); or 157 (4); or Q SCI 291, 292 (3, 3). Statistics—Q SCI 281 or 381 (5, 5).

*Environmental Sciences:* (11 credits minimum) BIOL 472, Ecology (3); BIOL 473, Limnology (3); and OCEAN 203, Introduction to Oceanography (5); or BIOL 474, 475, Ecology Laboratory, Limnology Laboratory (3, 2).

Fisheries Science: (14 credits minimum) FISH 101, 311, 401 (5, 4, 5).

Social Science: (11 credits minimum) The following courses are recommended: ECON 211, General Economics (3); ECON 435, Natural Resource Utilization and Public Policy (5); 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 R 451, Outdoor Recreation Economics (3); FOR R 452, Sociology of Leisure and Outdoor Recreation (2); Q SCI 382, 383, Statistical Inference in Applied Research (5, 5); SOC 110, Survey of Sociology (5); SOC 330, Human Ecology (5). Choose at least 5 credits from: FISH 425, 460, 499 (5; 5; 1–3, max. 9); FOR R 467, Sociology of Natural Resources (2); Q SCI 480, Sampling Theory for Biologists (4); URB P 440, Forecasting Methods in Urban Planning (3).

Aquatic Resource Management: FISH 379, 425 (3, 5); Q SCI 382, 383, Statistical Inference in Applied Research (5, 5); Q SCI 391, Introduction to Matrices and Their Application (3); Q SCI 376, Operations Research in Resource Utilization I (3); Q SCI 456, Mathematical Models in Population Biology (4); Q SCI 457, Management of Exploited Animal Populations (4); Q SCI 486, Experimental Design (3).



Water Quality: BOT 443, 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, 471, 472, 477 (3, 3, 3, 3); Q SCI 382, 383, Statistical Inference in Applied Research (5, 5).

Fish Processing: CHEM 221, Quantitative Analysis (5); FD SC 380, 381, 481, 484 (3, 3, 5, 5); MICRO 301, 302, General Microbiology and Laboratory (3, 2), or 400, 401, Fundamentals of Bacteriology and Laboratory (3, 3). For this set, choose CHEM 231, 232, Organic Chemistry (3, 3) from the core curriculum.

General Environmental Studies: FISH 459 (5); FD SC 381 (3); WLF S 350, Survey of Wildlife Biology and Conservation (3). Choose at least 15 credits from : CEWA 450, Man and the Pollution of His Environment (3 or 5); FISH 434, 435, 472, 473 (4, 3, 3, 3); FOR R 493, Ecology of the Northwest I (2); GEOG 303, Perspectives on Man and Nature (5); GEOG 444, Geography of Water Resources (3 or 5); ZOOL 465, Natural History of Mammals (5).

#### **Bachelor of Science Degree With a Major in Fisheries**

A student who wishes to enlarge his opportunity for a choice of electives may pursue a Bachelor of Science degree with a major in fisheries. In addition to the core curriculum, he or she selects any single set of prescribed courses from the above seven sets. Electives, sufficient to bring total credits to 180 and fisheries credits to 36, are subject to approval by the college.

## FOOD SCIENCE

Adviser John Liston 217 Fisheries

#### Bachelor of Science Degree With a Major in Food Science

The food science program provides a curriculum leading to a Bachelor of Science degree with a major in food science. It is recommended that the entering student has completed mathematics to include advanced algebra and trigonometry, and laboratory science to include chemistry and physics.

## FOOD SCIENCE MAJORS

A student continues as a food science premajor until the credits required by the premajor program have been completed. In addition to these core requirements, the following courses must be taken by students whose applications for major status have been accepted by the college:

Students who intend to proceed to graduate study should consult with an adviser about the substitution of courses at a more advanced level in certain areas for those listed in the outline.

A suggested sequence of courses for the four-year curriculum in food science is as follows:

*First Year:* First quarter—CHEM 140 (4); MATH 105 (5); electives (6). Second quarter—CHEM 150, 151 (4, 2); electives (9). Third quarter—CHEM 160, 170 (4, 3); MATH 157 (4).

Second Year: First quarter—CHEM 231, 241 (3, 2); ENGL 271 (5); PHYS 114 (4); elective (1). Second quarter—CHEM 232, 242 (3, 2); PHYS 115 (4); electives (6). Third quarter—CHEM 221 (5); Q SCI 281 (5); PHYS 116 (4); elective (1).

*Third Year:* First quarter—MICRO 301, 302 (3, 2); PC EH 440 (4); electives (6). Second quarter—CHEM 350 (3); FD SC 380 (3); PC EH 441 (4); electives (5). Third quarter—BIOC 405, 408 (5, 3); FD SC 481 (5); electives (2).

Fourth Year: First quarter—FD SC 482, 484, 498 (5; 5; 1–6, max. 6); FISH 395 (3). Second quarter—FD SC 483, 485, 498 (5; 5; 2, max. 6); electives (3). Third quarter—FD SC 486, 498 (5; 2–6, max. 6); electives (8).

#### GRADUATE PROGRAMS

The Graduate Student Guide of the College of Fisheries should be consulted for more complete information.

#### Admission

Basic requirements for admission to the graduate program in the College of Fisheries are a bachelor's degree from an institution of recognized standing, a grade-point average of 3.00 in the junior and senior years of college work, approval of the College of Fisheries, and approval of the Graduate School. Preference will be given to those with a strong background in the basic sciences. A student admitted with a bachelor's degree is accepted initially for a Master of Science degree program.

The College of Fisheries is now under an enrollment quota imposed on the entire University. This limits the number of students who can be admitted to a number approximately equal to those who graduate. Prospective students should obtain current information on the procedures used to evaluate applications for admission from the graduate program adviser or the Dean's office so as to make the best presentation of their talents and experience in their application for admission.

#### Graduate Program Adviser

William K. Hershberger 180 Fisheries

#### Alternate Graduate Program Advisers

Donald A. McCaughran, John Liston (Food Science).

Graduate students in the College of Fisheries are required to take a minor or a minimum number of supporting courses in selected departments of the University. The nature and number of such courses are determined by the student's Supervisory Committee.

#### Master of Science Degree

At least one year of approved study, with the completion of a research project, leads to the master's degree. A minimum of 45 upper-division or graduate credits must be earned, including 18 credits for FISH 700 or FD SC 700, 3 credits in FISH 520 and 522, and 6 additional credits in courses numbered 500 or above; food science majors must complete 6 credits in FD SC 521. The degree requirements must be completed within six years.

#### **Doctor of Philosophy Degree**

Students must complete at least three years of graduate study, including a dissertation. Credits earned for a master's degree may be applied toward the doctoral degree. The master's requirements for FISH 520, 522, and FD SC 521 must be met, if not achieved as part of a master's program. Preparation of a dissertation requires registration for 36 credits in FISH 800. Requirements must be completed in no more than ten years.

#### Foreign-Language Requirements for Advanced Degrees

The foreign-language requirement for the master's degree will be satisfied by any one of the following: 1. One year of foreign-language study in college with passing grades.

2. Independent study courses equivalent to 1. above.

3. Summer intensive courses at the University of Washington with passing grades.

4. Educational Testing Service examination with passing grade.

5. Two years of foreign-language study in high school with passing grades.

6. Completion of secondary school education in a language other than English.

The foreign-language requirement, if any, for the Ph.D. degree, in addition to fulfillment of the master's degree requirements, will be determined by the student's Supervisory Committee.

#### Financial Aid and Employment

In addition to that contained in the *Handbook of Scholarships*, obtainable from the Office of Student Financial Aid, 170 Schmitz, information concerning graduate student support is available at the office of the Dean. Numerous scholarships, fellowships, and teaching and research assistantships are available for qualified graduate students. Students requiring financial support should make application at the office of the Dean.

The specific fishery orientation of the college program is supported by a unique combination of subject interests among the faculty, wide range of equipment, and physical facilities. These factors, together with the active research program, put graduate students in a very favorable position to pursue programs leading to advanced degrees.

Opportunities for graduate work at the College of Fisheries are supplemented by the presence of international, federal, and state fishery and water research agencies that have staffs working in laboratories on or near the campus. In the college as lecturers are many senior research or affiliate faculty members of the cooperating laboratories, as well as many experts from industry. Besides finding financial support in such laboratories, graduate students may, under special arrangements, carry out research that, upon approval, may be used to satisfy the thesis requirements for the advanced degrees.



## FOREST RESOURCES

#### Dean

James S. Bethel 115 Anderson

#### **Associate Deans**

Stanley P. Gessel, David P. Thomas.

#### Faculty

Allan, Atkinson, Bare, Bethel, Bradley, Brockman (emeritus), Bryant, Cole, Dowdle, Driver, Erickson, Field, Fritschen, Gara, Gardner, Gessel, Grondal (emeritus), Hatheway, Hendee, Hrutfiord, Jayne, Johnsey, Kelley, Kenady, Kenyon, Lawrence, Leney, Lysons, Manuwal, Marckworth (emeritus), Martin, Mc-Caughran, Morison, Murphy, Payne, Pearce (emeritus), Pickford, Pitman, Riekerk, Robertson (emeritus), Russell, Rustagi, Sarkanen, Schaeffer, Schrader, Schreuder, Scott, Sharpe, Smathers, Spyridakis, Steinbrenner, Stenzel, Stettler, Taber, Thomas, Turnbull, Ugolini, Wagar, Waggener, Weisbrod, Winjum, Wilson, Witt, Wooldridge, Zasoski.

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. Students can consult with advisers in planning their schedules to include the specific academic requirements for SAF and civil service qualifications.

Graduate programs in forest resources are designed to accommodate a wide range of educational objectives. A student may concentrate upon advanced professional training or upon appropriate science or social science disciplines that are related to forestry.

The College of Forest Resources offers curricula leading to the degree of Bachelor of Science in Forest Resources and, through the Graduate School, the degrees of Master of Forest Resources, Master of Science, and Doctor of Philosophy.

The College of Forest Resources faculty helps forestry students to obtain summer employment while in the University and permanent employment upon graduation. Summer work is available through several federal and state public agencies and numerous private companies in the wood-using industry of the region. Many of these agencies and companies send representatives to the college to interview prospective employees. All students are encouraged to seek suitable summer employment, because such work offers an excellent opportunity for both practical experience and financial help.

#### **Undergraduate Programs**

In addition to meeting the University's general admission requirements for all undergraduates, students who plan to enter the College of Forest Resources should have completed Algebra III (intermediate) and a course in trigonometry. While in high school, prospective students also should have completed at least one unit of biological science and one unit of physical science.

A choice of high school electives in the natural sciences, social sciences, and humanities serves to strengthen a student's preparation for University study. This part of the applicant's record receives the same careful 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 elective credits outside the College of Forest Resources in order to broaden their education beyond that provided in the specialized curricula.

Students in all curricula must meet general requirements of the University and the college. Specific college regulations state that no required course may be taken on a satisfactory/unsatisfactory or credit/no credit basis. Specific curriculum requirements are described below under the division programs.

Undergraduate programs offered by the college are administered by three divisions. The Management and Social Sciences Division administers programs in forest management, outdoor recreation, and forest engineering. The Biological Sciences Division administers programs in forest sciences and wildlife science. The Wood and Paper Division administers programs in wood and fiber science and in pulp and paper technology.

The advising of students is the joint responsibility of the College Advising Center and the divisions. All students entering the Management and Social Sciences Division and the Biological Sciences Division are considered to be premajors until they have completed at least 75 credits of applicable lower-division course work with a cumulative grade-point average of at least 2.00. At this level, students are admitted to unrestricted upperdivision curricula with concurrent registration for remaining lower-division requirements. Certain majors may be designated as restricted majors, a status to which admission sometimes necessitates compliance with additional selection procedures. Students who contemplate entering a restricted major should contact the College Advising Center no later than the February 1 preceding the junior year regarding submission of a restricted major application and other selection procedures in effect.

The honors program in the College of Forest Resources provides opportunities in all curricula for students who qualify. The program is directed by two members of the college faculty. Students may request information from the honors advisers.

FOREST RESOURCES



# MANAGEMENT AND SOCIAL SCIENCES DIVISION

Chairman

Thomas R. Waggener 123 Anderson

Programs in the Management and Social Sciences Division are oriented toward professional careers in the management of forested lands. Emphasis in all programs is on the application of the social, physical, and biological sciences to forest resource management and allocation problems. The curriculum in forest management prepares the student to 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 R 100, Introduction to Forest Resources Management (5 credits); FOR R 201–207 (to total 4 credits). Mathematics<sup>1</sup>—Q SCI 291, 292, Analysis for Biologists (6); Q SCI 281, Elements of Statistical Method (5). Physical sciences—CHEM 101, General Chemistry (5); PHYS 114, 117, General Physics and Laboratory (5). Biological sciences<sup>2</sup>— BIOL 101–102, General Biology (10). Earth sciences<sup>3</sup> (4). Social sciences—ECON 200, Introduction to Economics (5); English, engineering, or humanistic-social studies<sup>4</sup> (3); electives<sup>5</sup> (5). Engineering sciences— ENGR 123, Graphics (2); Free electives (16). Curriculum specialization<sup>6</sup> (15).

FOREST MANAGEMENT CURRICULUM SPECIALIZATION Physical sciences—CHEM 102, General Chemistry, or PHYS 115, 118, General Physics and Laboratory (5 credits). Social sciences—electives (5); English, engineering, or humanistic-social studies<sup>4</sup> (3). Computer programming<sup>7</sup> (2).

OUTDOOR RECREATION CURRICULUM SPECIALIZATION Social sciences—SOC 110, Survey of Sociology (5 credits); approved electives<sup>5</sup> (5); English, humanistic-social studies, or engineering<sup>4</sup> (3). Free electives (2).

FOREST ENGINEERING CURRICULUM SPECIALIZATION Physical sciences—PHYS 115, 118, General Physics and Laboratory (5 credits). Social sciences—electives (5). Engineering sciences—ENGR 161, Plane Surveying (3); computer programming<sup>7</sup> (2).

#### **Upper-Division Requirements**

FOREST MANAGEMENT CURRICULUM SPECIALIZATION Forest resources—FOR R 300, Dendrology (5 credits); FOR R 320, Forest Ecology (5); FOR R 322, Silviculture I Methods (3); FOR R 340, Forest Surveying (3); FOR R 360, Forest Measurements (5); FOR R 362, Aerial Photos in Forestry (3); FOR R 365, Forest Resources Management I (5); FOR R 468, Forest Resources Management II (5); FOR R 469, Forest Resources Management III (5); forest resources electives<sup>8</sup> (21). Forest resources, wildlife science, quantitative science (10). Free electives (20).

FOREST ENGINEERING CURRICULUM SPECIALIZATION Forest resources—FOR R 300, Dendrology (5 credits); FOR R 304, Wood: Properties and Best Use (3); FOR R 320, Forest Ecology (5); FOR R 340, Forest Surveying (3); FOR R 360, Forest Measurements (5); FOR R 362, Aerial Photos in Forestry (3); FOR R 365, Forest Resources Management I (5); FOR R 377, Elements of Timber Design (4); FOR R 440, Construction (4); FOR R 441, Forest Engineering (5); FOR R 442, Financial Analysis of Logging Equipment and Operations (4); FOR R 443, Safety in Forest Industries (1); FOR R 446, 447, 448, 449, Senior Forest Engineering Field Studies (15). Civil engineering-CETC 310, Forest Highway Location (5); CETC 417, Cadastral Surveys (3); electives<sup>8</sup> (6). Business administration and economics electives<sup>8</sup> (9). Statistics and operations research electives<sup>8</sup> (6). Free electives (4).

OUTDOOR RECREATION CURRICULUM SPECIALIZATION Forest resources—FOR R 320, Forest Ecology (5 credits); FOR R 340, Forest Surveying (3); FOR R 350, Field Studies in Outdoor Recreation (3); FOR R 351, Introduction to Outdoor Recreation (5); FOR R 353, Principles of Natural History Interpretation (3); FOR R 354, Introduction to Management of Recreation Areas (3); FOR R 355, Introduction to Planning and Design of Recreation Areas (3); FOR R 362, Aerial Photos in Forestry (3); FOR R 452, 453, 455, Advanced Outdoor Recreation Studies (2–5); FOR R 459, Case Studies in Outdoor Recreation (5). Forest resources electives<sup>8</sup> (20–22). Free electives (32).

### BIOLOGICAL SCIENCES DIVISION

Chairman

Leo J. Fritschen 104 Winkenwerder

The programs administered by the Biological Sciences

Division provide sufficient flexibility to allow for a variety of preparation in natural resources as related to forestry. A student's objective can be either a professional career following undergraduate education or subsequent graduate training.

The wildlife science curriculum provides a sound foundation in natural sciences, mathematics, and social sciences and in their application to the conservation and manipulation of wildlife populations. The curriculum supplies an excellent basis for graduate study in this field.

The forest science curriculum allows much latitude for specialization, but it can be used to best advantage when the student seeks to become qualified as a professional forester, as defined by the United States Civil Service or the Society of American Foresters, and at the same time to develop in depth a particular area of interest in the natural resource field. Suggested programs of this nature are available in the following options: environmental analysis, forest genetics, forest hydrology, forest protection, forest soils, physical processes in forest ecology, resource management, population and community ecology, urban forestry, and wildlife. For details, interested students should consult either an academic adviser in the division or the college curriculum adviser as early as possible in order to utilize lowerdivision electives appropriately.

#### **Forest Science Curriculum**

#### Lower-Division Requirements

Forest resources—FOR R 100, Introduction to Forest Resources Management (5 credits); FOR R 201–207 (to total 4 credits). Mathematics<sup>1</sup>—Q SCI 281, Elements of Statistical Method (5); Q SCI 291, 292, Analysis for Biologists (6). Physical sciences<sup>9</sup>—introductory chemistry and physics (10). Biological sciences<sup>9</sup> (10). Social sciences and humanities<sup>10</sup> (15). Science electives<sup>11</sup> (15). Earth sciences<sup>12</sup> (5). Free electives (15).

#### Upper-Division Requirements

Forest resources electives<sup>13</sup> (30 credits). Mathematics, quantitative science, physical science<sup>9</sup> (9). Biological sciences<sup>9</sup> (9). Social sciences and humanities<sup>9</sup> (9). Free electives (33).

#### Wildlife Science Curriculum

#### Lower-Division Requirements

Biological sciences—BIOL 210, 211, 212, Introductory Biology<sup>14</sup> (15 credits). Physical sciences—CHEM 140, General Chemistry (4); CHEM 150, 151, General Chemistry and Laboratory (6), CHEM 231, 232, Organic Chemistry<sup>15</sup> (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 electives<sup>13</sup> (15); ENGL 271, 272, Advanced Expository Writing<sup>16</sup> (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 R 310, 320, 322, Forest Soils, Forest Ecology, Silvicultural Methods (13 credits); FOR R 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 -ZOOL 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-WLFS 350, Survey of Wildlife Biology and Conservation (3); WLF S 401, Biology and Conservation of Birds (4); WLFS 402, Wildlife and Man (3); WLF S 403, Wildlife and Land Use (3); WLFS 404, Biology and Conservation of Mammals (4). Approved electives (21).

## WOOD AND PAPER DIVISION DIVISION

Chairman

Kyosti V. Sarkanen 296 Bloedel

Programs in the Wood and Paper Division focus on the use of wood as a raw material for the many products derived from the forest. This orientation can be either toward professional aspects of forest-based industries or toward specialized scientific fields associated with wood utilization. Study in pulp and paper technology emphasizes principles related to chemical and mechanical production of wood pulp, manufacture of paper, and management of firms in the pulp and paper industry. Students completing this program may return for a fifth year and complete requirements for the Bachelor of Science in Chemical Engineering degree. The wood and fiber curriculum allows the student to orient his education in one of several directions through the choice of elective courses. The wood products option of this curriculum provides a background adaptable to a wide variety of employment opportunities in the forest products industries. The science option prepares the student eieither for graduate study or for industrial research positions.

#### Pulp and Paper Technology Curriculum Lower-Division Requirements

Forest resources-FOR R 101, Introduction to Wood and Paper (1). Mathematics-MATH 105, Elementary Functions (5); MATH 124, 125, 126, Calculus With Analytic Geometry (15); MATH 238, Elements of Differential Equations (3); MATH 281 or Q SCI 281, Elements of Statistical Methods (5); MATH 327, Advanced Calculus (3). Physical sciences-CHEM 140, General Chemistry (4); CHEM 150, 151, General Chemistry and Laboratory (6); CHEM 160, General Chemistry (4); CHEM 231, 232, Organic Chemistry (6); CHEM 241, Organic Chemistry Laboratory (2); PHYS 121, 122, 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 R 323, 324, Forest Biology I, II (6): FOR R 400, Wood and Fiber Structure (5): FOR R 401, Physics of Wood and Fiber Composites (4); FOR R R 403, Fibrous Structure and Rheology I (3); FOR R 406, Wood Chemistry I (3); FOR R 407, Wood Chemistry I Laboratory (2); FOR R 464, Economics of Forest Products Industries (3); FOR R 476, Pulp and Paper Technology (3); FOR R 477, Pulp and Paper Laboratory (2); FOR R 485, Undergraduate Research (3); FOR R 488, Polymer Chemistry (3). Physical sciences-CHEM 350, 351, Elementary Physical Chemistry (6). Engineering-CHE 310, Material and Energy Balances (4); CHE 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 R 101, Introduction to Wood and Paper (1). Mathematics—MATH 105, Elementary Functions (5); MATH 124, 125, 126, Calculus With Analytical Geometry (15); Q SCI 281 or MATH 281, Elements of Statistical Methods (5). Physical sciences— CHEM 140, General Chemistry (4); CHEM 150, General Chemistry (4); CHEM 231, 232, Organic Chemistry (6); PHYS 121, 122, 123<sup>18</sup>, Mechanics, Electromagnetism, and Oscillatory Motion, Waves (12). Biological sciences—BOT 110, Plants in Man's Environment (5). Social sciences—ECON 211, General Economics (3); ENGL 171, 172, College Writing (6). Electives<sup>19</sup> (24). FOREST RESOURCES



#### **Upper-Division Requirements**

Forest resources—FOR R 323, 324, Forest Biology I, II (6); FOR R 374, Wood Utilization (3); FOR R 400, Wood and Fiber Structure (5); FOR R 401, 402, Physics of Wood and Fiber Composites (8); FOR R 403, Fibrous Structure and Rheology I (3); FOR R 406, Wood Chemistry I (3); FOR R 407, Wood Chemistry I Laboratory (2); FOR R 408, Wood Chemistry II (3); FOR R 464, Economics of Forest Products Industries (3); FOR R 476, Pulp and Paper Technology (3); FOR R 477, Pulp and Paper Laboratory (2); FOR R 485, Undergraduate Research (3); FOR R 488, Polymer Chemistry (3). Electives<sup>19</sup> (43).

### WOOD PRODUCTS OPTION

#### Lower-Division Requirements

Forest resources—FOR R 101<sup>20</sup>, Introduction to Woodland Paper (1). Mathematics—MATH 105, Elementary Functions (5); Q SCI 291, 292, Analysis for Biologists (6); Q SCI 281 or MATH 281, Elements of Statistical Methods (5). Physical sciences—CHEM 101, General Chemistry (5); CHEM 102, General and Organic Chemistry (5); PHYS 114, 115, General Physics (8). Biological sciences—BOT 110<sup>21</sup>, Plants in Man'sEnvironment (5). Social sciences—ECON 200<sup>22</sup>, Introduction to Economics (5); English, engineering, or humanistic-social sciences<sup>4</sup> (6). Electives<sup>23</sup> (39).

#### Upper-Division Requirements

Forest resources—FOR R 323, 324, Forest Biology I, II (6); FOR R 374, Wood Utilization (3); FOR R 375, Wood Utilization Laboratory (2); FOR R 377, Elements of Timber Design (4); FOR R 400, Wood and Fiber Structure (5); FOR R 401, Physics of Wood and Fiber Composites (4); FOR R 406, Wood Chemistry I (3); FOR R 407, Wood Chemistry I Laboratory (2); FOR R 464, Economics of Forest Products Industries (3); FOR R 470, Wood Deterioration and Control (4); FOR R 472, Plywood and Laminating Processes (3). FOR R 473, Gluing Process Technology (4); FOR R 476, Pulp and Paper Technology (3); FOR R 477, Pulp and Paper Laboratory (2); FOR R 485, Undergraduate Research (3). Electives.<sup>24</sup>

See "Explanation of Requirements" on page 207.

Graduate Programs Graduate Program Adviser Robert I. Gara 102 Winkenwerder

Graduate programs offered in forest resources lead to degrees of Master of Forest Resources, Master of Science, and Doctor of Philosophy. Graduate students usually center their graduate study in one of the 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. Soon after he or she is enrolled, the student is assigned a Graduate Program Committee, which is responsible for guiding the student in the early stages of the graduate program.

Graduate education in the management and social sciences specialization includes programs in forest land management, resource economics, economics of the forest products industry, forest biometry, forest fire science, forest engineering, forest policy, mensuration, watershed management, forest photogrammetry, forest recreation, forest sociology, and conservation.

In the biological sciences specialization, graduate study and research include the fields of wood anatomy and morphology, genetics of forest trees, forest tree physiology, tree nutrition, ecology of forest tree species and communities, forest soils, forest meteorology, forest influences, forest entomology, forest pathology, forest hydrology, silviculture, and wildlife biology.

The wood and paper specialization offers graduate programs in the physics of wood and fiber composites, nonwoven systems technology, wood and extractives chemistry, wood technology, pulp and paper technology, and composition board technology.

Other special programs can be developed in response to particular graduate needs.

In all areas of study, the college maintains a close working relationship with faculties in associated colleges and departments throughout the University, including service on graduate committees.

#### Admission

A student who intends to work toward an advanced degree must apply for admission to the Graduate School and must meet the requirements set forth by the Graduate School and the College of Forest Resources.

Basic requirements for admission to the Graduate School are a bachelor's degree from an institution of recognized standing, high academic performance in the junior and senior years of college work, approval of the Dean of the Graduate School, and approval of the college in which the work is to be taken. For complete information, see the "Graduate Study" section of this catalog.

In addition to requesting admission forms from the Graduate Admissions Office, an applicant should obtain admission and reference forms from the Dean of the College of Forest Resources. These forms contain supplementary information required by the applicant.

#### Master of Forest Resources Degree

The Master of Forest Resources degree is a professional degree offered for the student who desires to acquire a greater competence in a specific subject area of forest resources. Course work may be in forest resources and in appropriate natural and social sciences. Both thesis and nonthesis options are available.

#### Master of Science Degree

The Master of Science degree is a learned degree, often precursory to the Doctor of Philosophy degree. Its requirements include a minor of at least 9 credits in a field outside the major. Both thesis and nonthesis options are available. The nonthesis program requires at least 6 credits of research.

#### **Doctor of Philosophy Degree**

The Doctor of Philosophy degree may be preceded by baccalaureate education either in forest resources or in another discipline. The program comprises an approoriate selection of courses in forest resources and in the related natural and social sciences. The program requires of the student successful preparation for the General Examination in forest resources and the necessary research and dissertation. The time required, beyond minimum limits, for the preparation depends on the thoroughness and the applicability of prior course work. Reading proficiency may be required in one foreign' language, subject to Graduate Program Committee recommendation. If required, the language examination should be passed within two years of the baccalaureate degree or within one year of the master's degree, whichever has preceded the doctoral work, and it must be passed before the General Examination is taken. The General Examination, which may be oral, centers on the specific areas of forest resources and of natural or social science in the student's major field. The examination covers most of the remaining subject matter of forest resources.

#### **Scholarships and Financial Aids**

Students interested in undergraduate and graduate scholarships, fellowships, assistantships, and awards available specifically to students in the College of Forest Resources may contact the Office of Student Financial Aid, 105 Schmitz, for information, which also may be obtained from the associate dean, 107 Anderson.

The Washington Pulp and Paper Foundation, Inc., provides scholarships for students preparing for careers in the pulp and paper industry. Awards are based upon



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 115 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, 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, Laboratories for Forest Resource Management, and the Laboratories for International Forest Resources Studies.

Center for Forest Ecosystem Studies Director Dale W. Cole 204 Bloedel

The Center for Forest Ecosystem Studies is responsible for the college research programs in the biological area. The interests of the scientists working in the biologically based investigations are highly diverse and extend from the urban-oriented Washington Park Arboretum to the Cascade wildlands and its habitat. The principal effort among nearly a score of research projects in the division is the Coniferous Forest Biome study in the International Biological Program. The ecosystem center also provides administrative supervision for all the college lands (see "Research Areas and Facilities") in addition to the coordination and services for biological research. Laboratories for Forest Resource Management Director Gerard F. Schreuder

123G Anderson

The Laboratories for Forest Resource Management are an interdisciplinary group concerned with wildlands use planning and management, decision making on forest practices and associated environmental impacts, forest product manufacturing, and outdoor recreation. Research in the nearly thirty concurrent projects stresses social, economic, and technological considerations, using and building onto the biological information generated by the Center for Ecosystem Studies.

Laboratories for International Forest Resources Studies Director

Kenneth J. Turnbull 107 Anderson

The people of Washington State long have had a profound involvement in the forest resources of other countries through an ever-increasing volume of commerce and intellectual and social interchange. The objective of these laboratories is to develop and assist programs of study of forest resources in other lands and their products with respect to their biology management, economics, manufacture, legislation, and administration. For example, specific programs now active include studies of tropical forest ecosystems in Latin America and Thailand, impact of herbicide on forests of Vietnam, wildlife and forest insects in Chile, foreign log supply and the domestic market, national parks in Central America, and control of insect pests of mahogany. When possible, the topics of study are selected not only to foster the interests of individuals and groups in this state but also to promote the national interest and to aid the scientific community at large.

#### **College Facilities**

The college occupies a complex of three buildings: Alfred H. Anderson Hall, the Hugo Winkenwerder Forest Sciences Laboratory, and Julius H. Bloedel Hall. The modernized Anderson Hall, the eight-year-old Winkenwerder building, and the recently completed Bloedel Hall provide the college with excellent areas and equipment for scientific laboratories, classrooms, seminar rooms, special collections, and administrative offices.

The library, a branch of the University's Suzzallo Library, houses more than 26,000 bound volumes and 33,000 pamphlets, reports, and monographs. It also has an excellent collection of approximately 2,500 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 2,300 acres located at La Grande, Washington, sixty-five miles from the University, consists of highly developed field research facilities and teaching and living accommodations in an excellent terrestrial ecology area.

The Lee Memorial Forest, a 158-acre property at 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.

#### FOREST RESOURCES



#### **Explanation of Requirements**

1. Or equivalent courses.

2. Or BIOL 210, 211, 212.

3. From GEOL 101, 205, 310 or ATM S 101, 201, 301.

4. From Q SCI 340, ENGL 111, 121, 171, 172 or ENGR 130, 131 or HSS 302.

5. From the social sciences section of the College of Arts and Sciences distribution list. For outdoor recreation, courses must be selected from ANTH 100, PSYCH 100, POL S 101 or 102, and at least one humanities course must be taken.

6. Completion of curriculum specialization consistent with the selection of upper-division major.

7. From ENGR 141, 215, 315 or Q METH 200 or equivalent courses.

8. From approved elective lists.

9. To be selected with the approval of adviser.

10. From the social sciences and humanities sections of the College of Arts and Sciences distribution list.

11. From natural sciences, social sciences, and humanities.

12. From GEOL 101, 205, 311 or ATM S 101, 201, 301.

13. From approved list.

14. Or BIOL 101 102 and BOT 113 or 220.

15. Or PHYS 114, 115.

16. Or ENGR 130, 131.

17. ZOOL 409 or 458 may be substituted.

18. Or PHYS 114, 115, 116 with adviser's approval.

19. A minimum of 27 credits must be taken in the humanities or social sciences, or both, as well as 18 credits of approved sciences and engineering electives, of which 6 must be laboratories.

20. Or FOR R 100.

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 R 201 through 207, ENGR 120, 121, M E 302, 303, ACCTG 210, 220, 230.

24. A minimum of 29 credits must come from approved list.



## INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

## ART HISTORY

131 Art

#### Faculty

Millard B. Rogers, Chairman; Bliquez, Bravmann, Christofides, Edmonson, Grossmann (emeritus), Holm, Kingsbury, Opperman, Pascal, Pundt, Reed, van der Marck, Webb, Weston, Wilson. Millard B. Rogers, graduate program adviser.

In art history, students study the creation and meaning of works of art in relation to the artists and cultures that produce them.' Being, in nature, comparative, the history of art involves the interaction of styles and ideas from different centers over long periods of time; hence, its study requires many different skills, including languages, bibliography, historic and stylistic analysis, and connoisseurship. Advanced study in the history of art leads primarily to positions in higher education and museums and is research oriented. Students are encouraged to work in areas in which the program offers special strengths, including Asian, Classical, Primitive, and Tribal, and Western art from the Renaissance to the present. The graduate program in art history leading to the Doctor of Philosophy degree is administered by an interdisciplinary art history group of the Graduate School. The Bachelor of Arts and Master of Arts degrees in art history are administered by the School of Art.

#### **Doctor of Philosophy Degree**

Admission Requirements: Prior sound preparation at a general level, which usually means having acquired a Master of Arts degree in the history of art.

Graduation Requirements: (1) a minimum of 72 credits in art history and related fields beyond the Bachelor of Arts degree, exclusive of thesis and dissertation credits; at least 36 of these must be in courses numbered 500 or above, of which a maximum may be in fields related to art history; (2) reading knowledge of French or German as tested by the Educational Testing Service examination, plus reading knowledge of one or more additional languages as determined by the student's Supervisory Committee; (3) a General Examination, written and oral, taken prior to enrollment for dissertation credits; this examination covers three fields of art history chosen from the following general areas: (a) South and Southeast Asia, (b) Eastern Asia, (c) Primitive and Tribal, (d) Ancient, (e) Medieval, (f) Renaissance, (g) Baroque, (h) Modern (no more than two fields may be selected from the same area); (4) preparation and defense of a dissertation requiring a minimum of 27 additional credits at the 800 level. In most cases,



the student must expect to work and travel abroad in order to acquire firsthand knowledge of the works of art involved in the dissertation research.

Financial Assistance: The graduate art history program offers the Samuel H. Kress Foundation Fellowship of \$3,000 each year to a student who is pursuing a program in the history of art. Limited Kress funds are available for the assistance of graduate students in the history of art. Also available are teaching assistantships for which students may apply. It is a policy to make such awards only to students who have been in residence at the University of Washington for one year.

## **BIOLOGY TEACHING**

212 Johnson

#### Faculty

Ingrith Deyrup-Olsen, Chairman; Donald S. Farner, Associate Chairman; Douglas (Microbiology), Farner (Zoology), Gordon (Biochemistry), Halperin (Botany), Kohn (Zoology), Meeuse (Botany), Nester (Microbiology), 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 zoology. A minimum of 9–12 of these credits must be at or above the 500 level. In project work, 6–9 credits are required. These may take the form of a laboratory or field, library, or classroom study.

Award of the degree is recommended on successful completion of a written report on the project work and on passage of a general examination in the fields of the candidate's specific interests and course work.

Additional information about the program may be obtained from the graduate program adviser.

### BIOMATHEMATICS

F361 Health Sciences

#### Faculty

Richard A. Kronmal, Chairman; Birnbaum (Mathematics), Breslow (Biostatistics), Brown (Physiology and Biophysics), Chapman (Fisheries), Diehr (Biostatistics), Feigl (Biostatistics), Felsenstein (Genetics), Fisher (Biostatistics), Gallucci (Fisheries), Hatheway (Forest Resources), Jayne (Center for Quantitative Science), Kelley (Oceanography), Martin (Biostatistics), Mc-Caughran (Fisheries), Paine (Zoology), Pyke (Mathematics), Shorack (Mathematics), Stevens (Physiology and Biophysics), Thompson (Biostatistics), Turnbull (Forest Resources), Wahl (Biostatistics), Young (Physiology and Biophysics). 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. 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. For some of the elective courses in the program, a knowledge of chemistry or physics, or both, is necessary.

The number of students admitted to the biomathematics program is limited, and the selection is made by a faculty admissions committee. Review of applications begins in March for admission Autumn Quarter. The earlier an application is submitted, the greater is the possibility of admission. Applications also are accepted for other quarters.

In addition to fulfilling Graduate School requirements, an applicant must submit three letters of recommendation from persons competent to evaluate the applicant's abilities and a narrative statement regarding the applicant's purpose and interest in entering the program.

#### **Programs of Study**

The Biomathematics Group offers programs leading to a Master of Science degree or a Doctor of Philosophy degree.

#### MASTER OF SCIENCE DEGREE

Courses	•						Cı	red	its	
MATH 394, 395 Pr	obability (3,3)					•	•		6	
MATH 482, 483 Sta	itistical Inference (3,3)	•	•	•	•		6		6	
MATH 484 Distrib	ution-Free Inference.				•				3	
MATH 485 Analysi	s of Variance	<b>.</b> .	•	•		•			3	
PC BS 511, 512, 513	Medical Biometry I, II	[, II	I (	3,3	,3)				9	

Approved electives, 6–10 credits, depending upon student's background. At least 9 of the above course credits must be for work in courses numbered 500 or above. A thesis also is required,

#### DOCTOR OF PHILOSOPHY DEGREE

There are four pathways to the biomathematics Doctor of Philosophy degree. (1) The biostatistics pathway trains Ph.D. program students in biostatistics, usually with a medical or health services emphasis. (2 and 3) The quantitative ecology pathway offers an ecology emphasis with a close association with fisheries, forestry, wildlife, or oceanography. The student may choose between two alternative branches: an applied mathematics-differential equations branch and a probability-statistics branch. (4) Under exceptional circumstances, individual programs in other areas of biomathematics may be arranged.

#### **Biostatistics Pathway**

Courses															$\mathbf{C}$	ređ	its
MATH 394, 395, 482,	48	3,	484	4, a	nd	48:	5	(as	i li	ste	d	abo	ove	•	•	•	18
MATH 424, 425, 426 Analysis (3,3,3) .	۲ ۲	'ur	ida	ime	nta 1 T	l C	:0П	cel 	ots Sta	OI	tics	., ·	•	•	•	•	9
Inference (3,3,3).			· ai		•••		", "					<u>.</u>					9
• •										,							

Approved electives in biology of at least 9 credits. Particularly recommended are the following options: PC EP 511, 512, 513 (9 credits); GENET 351 or 451 (3); Q SCI 456, 457 (8); FISH 556, 557, 558 (9); BIOL 472 (3) and ZOOL 572, 574, 578 (11). Additional approved electives in biology or applied statistics so that the total is at least 15 credits.

All students are required to register for PC BS 580, Seminar in Biostatistics, for 1 credit per quarter for at least 5 credits. Approved electives may be taken for an additional 4 credits. Students who have not had a one-year course in applied statistics will be requested to take PC BS 511, 512, 513, Medical Biometry I, II, III, or an equivalent, such as Q SCI 382, 383, Statistical Inference in Applied Research. Also required are 3 credits in biostatistical consulting, such as Q SCI 499 or PC BS 590.

Additional Requirements: (1) Demonstration of competence in computer programming. (2) Examinations. Near the completion of the course work, the student takes the General Examination to qualify for advancement to Candidacy. The General Examination consists of written examinations in theoretical statistics, applied statistics, and an appropriate biological area, as well as an oral examination. The oral examination may be given to test the student's ability to integrate mathematical methods with the field of application or may deal with a dissertation proposal. (3) Dissertation. Most of the student's time after completion of the General Examination should be devoted to his or her dissertation research program, although consulting requirements might also be satisfied at that time.

#### Quantitative Ecology Pathway

Courses (For ]	Both Bran	ches)						С	red	lits
MATH 394, 3	95, 396 H	robability	r (3,3,3) .						•	9
Q SCI 381 I	ntroductio	n to Pro	bability a	ind S	tatistics	3.			•	5
and Q SCI 382	2, 383. Sta	atistical In	ference in	n App	lied					
Research (	5,5)	• • •		• •• •				•	•	10
or PC BS 511	512 513	Medical	Riometry	νTΤ	י דוד ד	12 2	3)			0

#### INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

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 R 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	C	redi	ts
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)	•	٠	6
MATH 484 Distribution-Free Inference	•	•	3
Stochastic Processes			
	0		•-

Comaca		/ 0	100	
BMATH 554	Stochastic Processes in the Life Sciences .	ί.		- 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) .	•		•	19
Analysis I. II. III (3.3.3)				9
A A 562, 563, 564 Methods of Partial Differential Equations I, II, III (3,3,3)	•	•	•	9
Nonlinear Differential Equations				
Course				Credits
MATH 538, 539 Nonlinear Ordinary Differential Equations (3,3)	•	•	•	6
PROBABILITY-STATISTICS BRANCH				
Statistical Theory				
Courses				Credits
MATH 482, 483 Statistical Inference (3,3)	•	•	•	6
MATH 484 Distribution-Free Interence MATH 485 Analysis of Variance	•	•	•	3
Followed by 9 credits from:				
Courses				Credits

Q SCI 480 Sampling Theory for Biologists	- •	•		•	4
Q SCI 486 Experimental Design	• •	•	•	•	3
PC BS 571, 572, 573 Special Topics in Advanced	1				
Biostatistics (3,3,3)	•	•	•		9
MATH 424, 425 Fundamental Concepts of Analysis	(3,3)	•	•	٠	6

#### Stochastic Processes

Courses		Cı	ed	its
MATH 491, 492	Introduction to Stochastic Processes (3,3)	•	•	6
or BMATH 554	Stochastic Processes in the Life Sciences .	•	•	3

Followed by either:	
Advanced Statistics	
Courses	Credits
MATH 581, 582, 583 Advanced Theory of Statistical Inference	9
or Advanced Probability	•
Courses MATH 521, 522, 523 Probability (3,3,3)	Credits

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. To qualify for advancement to Candidacy, the students in the Probability-Statistics Branch take the same General Examination as do the biostatistics students (i.e., a written examination in theoretical statistics, applied statistics, an appropriate ecological area, and an oral examination). To qualify for advancement to Candidacy, the students in the Applied Mathematics-Differential Equations Branch take a sequence of written examinations in applied analysis prepared by the biomathematics faculty in consultation with the mathematics faculty, plus a written examination in an appropriate ecological area and an oral examination. (3). Dissertation. Most of the student's time after completion of the General Examination should be devoted to his or her dissertation research program, although consulting requirements also might be satisfied at that time.

#### COMPARATIVE LITERATURE **B434** Padelford

#### Faculty

Frank J. Warnke, Chairman; Ernst Behler, Associate Chairman; D. Behler, E. Behler, Christofides, Ellrich, Grummel, Hildeman, Hruby, F. Jones, L. Jones, Konick, J. Leiner, W. Leiner, Loraine, MacKay, Mc-Kinnon, McLean, Reinert, Sehmsdorf, Thompson, Wang, Warnke, Willeford. Frank W. Jones, graduate program adviser.

The graduate program in comparative literature leading to the Master of Arts or Doctor of Philosophy degree is administered by an interdisciplinary Comparative Literature Group of the Graduate School.

The comparative study of literature concerns itself with literature in its essential nature, not as restricted to one specific national culture or language. The comparative task proceeds by means of concentration on two or more national literatures, studied in their original languages. Typical areas of inquiry for the comparative literature scholar include literary traditions prevailing for long periods of time in large cultural areas, major genres and forms as they are manifested in different linguistic and cultural environments, patterns of influence and reception of literary works among various national cultures, and the general principles of literary theory and criticism.

On receiving the Master of Arts or Doctor of Philosophy degree, the graduate is qualified for teaching and research in comparative and world literature and in the history of literary genres, as well as in the language and literature of his or her specialization.

#### Master of Arts Degree

Admission Requirements: Bachelor of Arts degree in comparative literature, English, or any foreign literature, or equivalent background. Advanced competence in one foreign language.

Graduation Requirements: 40 quarter credits, of which 25 must be in courses at the 500 or 600 level, with a maximum of 10 credits of 600-level work, allowed except with special permission. Of the required work, three courses, or a minimum of 10 credits, must be taken in comparative literature, including C LIT 510; the remaining must include study in two or more literatures, and at least three courses must be taken in each of two literatures. Advanced foreign-language competence must be demonstrated on entering the program; basic reading knowledge of a second foreign language must be acquired before the degree is awarded. A comprehensive written examination must be taken after completion of course work. With permission of the graduate program adviser, a thesis may be presented for 10 of the 40 credits.

#### Doctor of Philosophy Degree

Admission Requirements: Master of Arts degree in comparative literature, English, or any foreign literature, or equivalent background. Advanced competence in two foreign languages and a basic reading knowledge of a third.

Graduation Requirements: A minimum of 80 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, except with special permission. Of these total credits, at least 20 must be in comparative literature courses, including C LIT 510 and 511 or any equivalent course in linguistics or stylistics; at least 35 credits in the literature of major interest to the student; at least 25 credits in the student's minor field or fields. If more than one minor field is chosen, at least 15 credits must be taken in each. With permission, one of two minor fields may be history, philosophy, art, or other subjects not covered by the departments participating in the comparative literature program. Written and oral General Examinations, dissertation, and Final Examination complete the Ph.D. degree requirements.

During the period of study, students working for advanced degrees in comparative literature are eligible for teaching assistantships in the language of their major literature, namely, Asian, classics, English, Germanics, Near Eastern, Romance, Scandinavian, or Slavic.

Additional information regarding the comparative literature program may be obtained from the comparative literature office, B434 Padelford.

## COMPUTER SCIENCE

228 Roberts

#### Faculty

Jerre D. Noe, Chairman; Baer, Cramer, Dekker, Diehr, Gillespie, Golde, Goldstein, Herriot, Holden, Hunt, Johnson, Kehl, Klee, Kronmal, Ladner, Lewis, Pyke, Ritchie, Rockafellar, Shaw, Sobolewski. D. Dekker, graduate program adviser.

Computer science is devoted to the representation, storage, manipulation, and presentation of information in an environment permitting automatic information systems. The computer scientist is interested in discovering the means by which information can be transformed in order to model and analyze the information transformations in the real world. This interest leads to: inquiry into both the theory and the application of effective ways to represent information of all forms, effective algorithms to transform information, effective languages with which to express algorithms, effective means to monitor the process and to display the transformed information, and economic ways to accomplish all of these.

#### Master of Science Degree

Admission Requirements: To be admitted to the graduate program in computer science, an applicant must satisfy the admissions criteria outlined in the "Graduate Study" section of this catalog. In addition to the application for admission to the Graduate School, the student must make a separate application to Computer Science showing background that includes: (1) a knowledge of computer organization and computer programming, including the development of algorithms; (2) advanced undergraduate preparation in the mathematical, natural, or engineering sciences, although this preparation does not imply a major in these fields.



Three letters of recommendation must accompany the application. Results of Graduate Record Examinations also are desired.

Graduation Requirements: Without Thesis-40 credits, of which at least 20 must be in courses at the 500 level or above. At least 30 credits must be in courses chosen from the computer science list. The remaining course work should be in one or more supporting fields. Satisfactorily passing a written examination on the computer science core curriculum. Submission of a written report acceptable to the student's faculty adviser, based on a computer science project in which the student has participated. With Thesis-40 credits, of which 9 must be from C SCI 700, Master's Thesis, and 20 must be in courses at the 500 level or above. At least 24 credits must be in courses chosen from the computer science list. The remaining course work should be in one or more supporting fields. Satisfactorily passing an oral examination on the thesis work. The computer science core curriculum and course list may be obtained from the adviser.

#### **Doctor of Philosophy Degree**

Admission Requirements: The same as for the Master of Science degree.

Graduation Requirements: (1) Passing a Ph.D. degree qualifying examination administered by Computer Science. The examination usually is taken after completion of one year of graduate study and covers breadth of knowledge in computer science, which can be obtained from the basic computer science courses. A detailed prospectus is issued well in advance of the examination. (2) Demonstrating proficiency in a foreign language, usually French, German, or Russian. (3) Passing the General Examination specified in the "Graduate Study" section of this catalog. In this examination, the student must demonstrate depth of knowledge in the area of programming languages and in one of a number of special areas acceptable to his or her Supervisory Committee. Examples of such areas are numerical analysis, computer design, and theoretical foundations of computer science, including automata theory, mathematical logic, and modern algebra. (4) Completing approximately 60 credits of course work, of which at least 40 credits are to be in courses numbered 500 or above, and approximately 45 credits should be in courses chosen from the computer science course list. Course work taken for the Master of Science degree is applicable to the Doctor of Philosophy degree. (5) Preparation of a dissertation acceptable to the Supervisory Committee. Students must register for at least 27 credits of C SCI 800, Doctoral Dissertation.

## DRAMA ARTS

113 Drama-TV

#### Faculty

Gregory A. Falls, Chairman; Falls (Drama), Jones (English), Kechley (Music), Kingsbury (Art), Loper (Drama), Lorenzen (Drama), McDiarmid (Classics), McKinnon (Asian Languages and Literature), Smith (Art), Wolcott (Drama). Gregory A. Falls, graduate program adviser.

Drama Arts Group of the Graduate School comprises faculty members from Drama, Art, Asian Languages and Literature, Classics, English, Music, Scandinavian Languages and Literature, Slavic Languages and Literature, and other disciplines. Through the group, the University offers a program that leads to the Doctor of Philosophy degree for students interested in research and scholarship.

The Doctor of Philosophy degree program in drama arts is concerned with the relationship of theatre history, criticism, and the theatre arts. The program for the first year concentrates on theatre history, with allied studies in criticism, architecture, and art. Students who enter the program are expected to have had some theatre experience, both practical and academic. Because of the interdisciplinary character of the faculty, intensive study of the drama and theatre of a number of nations is possible if the student has an appropriate language competence.

Proficiency in one foreign language is required. The General Examination consists of a series of prepared essays in a major field and an oral examination in both a major and a minor field. After the first year, the study is primarily in tutorials and independent projects in the student's major and minor fields.

## EAST ASIAN STUDIES

406 Thomson

The East Asian Studies Group, an interdisciplinary group of the Graduate School, offers programs that lead to the Master of Arts degree. The group, comprising faculty members from a number of disciplines cooperating within the Institute for Comparative and Foreign Area Studies, offers several East Asian regional specializations leading to the degree, and these are described later in this section.

Complete course listings and additional information may be obtained from the Institute for Comparative and Foreign Area Studies, the Department of Asian 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

James R. Townsend (Political Science), Associate Director; Brandauer (Asian Languages and Literature), Chan (Asian Studies), Chang (Geography), Cirtautas (Asian Languages and Literature), Dull (History), Hsiao (emeritus), Kapp (History), Knechtges (Asian Languages and Literature), Mah (Economics), Norman (Asian Languages and Literature), Poppe (emeritus), Serruys (Asian Languages and Literature), Taylor (Asian Studies), Treadgold (History), Wang (Asian Languages and Literature), Wilhelm (emeritus), Williston (emeritus), Wylie (Asian Languages and Literature), Yen (Asian Languages and Literature). Kozo Yamamura, graduate program adviser.

#### CHINA REGIONAL STUDIES

This course of study combines language instruction with area training. It is designed for the student with a Bachelor of Arts degree in a discipline (1) as a terminal degree in preparation for a career in government, journalism, business, or teaching, or (2) as a transitional degree for a Doctor of Philosophy degree program in a discipline. Students with Bachelor of Arts degrees in Chinese languages and area studies or the equivalent are encouraged to pursue programs leading to the Master of Arts or Doctor of Philosophy degrees in a discipline department and to concentrate much of their work on China.

#### **Course Requirements**

Language training is an essential component of the program. Each student is required to complete Chinese language training through at least the third year of instruction (45 credits); each student is encouraged to take as much instruction in Chinese as possible, including summer intensive courses. Interdisciplinary study is another essential component of the program. Each student is required to take EASIA 521-522, Seminar: Introduction to the Interdisciplinary Study of China (10 credits), during his or her first year. This two-quarter sequence introduces the student to work on China undertaken in various disciplines.

Course work in the disciplines is the third essential component of the program. A student can choose from a broad range of courses in disciplines, with the selections representing, at a minimum, a total of 26 credits in addition to EASIA 521–522. Of these 26 credits, 8 must be in courses at the 500 level or above.

#### Other Requirements

A student has the option of submitting two seminar papers or a thesis. The requirement for the two seminar papers may be met in the EASIA 521-522 sequence and in the discipline seminar. Both papers (or the thesis, which usually will build on work undertaken in the seminar) must be read and approved by at least two faculty members. A student also must pass a comprehensive oral examination covering course work and the seminar papers or thesis.

#### **Japan and Korea**



Kenneth B. Pyle (History), Associate Director; Beckmann (Asian Studies), Butow (History), Hanley (History), Hellmann (Political Science), Henderson (Law), Hiraga (Asian Languages and Literature), Kakiuchi (Geography), Lukoff (Asian Languages and Literature), McKinnon (Asian Languages and Literature), Miller (Asian Languages and Literature), Niwa (Asian Languages and Literature), Palais (History), Suh (Asian Languages and Literature), Takaya (Asian Languages and Literature), Tatsumi (emeritus), Webb (Art), Yamamura (Institute for Comparative and Foreign Area Studies and Economics). Kozo Yamamura, graduate program adviser.

#### JAPAN REGIONAL STUDIES

This course of study combines language instruction with area training. It is designed for the student with a Bachelor of Arts degree in a discipline (1) as a terminal degree in preparation for a career in government, journalism, business, or teaching, or (2) as a transitional degree for a Doctor of Philosophy degree program in a discipline. Students with baccalaureate degrees in Japanese language and area studies or the equivalent are encouraged to pursue programs leading to the Master of Arts or Doctor of Philosophy degrees in a discipline department and to concentrate much of their work on Japan.



#### 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 topicoriented research.

Course work in the disciplines is the third essential component of the program. Each student is expected to enroll in discipline courses totaling 25 credits, of which at least 8 must be in courses at the 500 level or above.

#### **Other Requirements**

Each student must submit an essay of distinction. The essay, which usually builds on work undertaken in EASIA 559, must be read and approved by at least two faculty members. A student must also pass a comprehensive oral examination covering course work and the essay.

#### KOREA REGIONAL STUDIES

This course of study combines language instruction with area training. It is designed for the student with a Bachelor of Arts degree in a discipline (1) as a terminal degree in preparation for a career in government, journalism, business, or teaching, or (2) as a transitional degree for a Doctor of Philosophy degree program in a discipline.

#### **Course Requirements**

Language training is an essential component of the program. Each student is required to complete Korean language training through at least the second year of instruction (30 credits), or KOREAN 313 or its equivalent. A student with language background will, on admission, usually be expected to continue to enroll in Korean language courses. Each student is required to take HSTAS 481, 482, History of Korea, and one graduate seminar in Korean history, either HSTAS 585, Research Seminar: Modern Korea, or HSTAS 583-584, Seminar in Korean History. Each student is expected to enroll in discipline courses totaling at least 36 credits, of which 18 or more must be at the 500 level or above. Students preparing for additional work in a Doctor of Philosophy degree program should consider taking additional language instruction in Japanese or Chinese and courses in Chinese or Japanese history, politics, and other social sciences.

#### Other Requirements

A student may submit an essay of distinction or two seminar papers. The essay may be an extension of a seminar paper, and it must be read and approved by at least two faculty members. If two seminar papers are submitted in lieu of an essay, one of them must be from HSTAS 585. Each student also must pass a comprehensive oral examination covering course work and the essay.

## HEALTH SERVICES ADMINISTRATION AND PLANNING

F351 Health Sciences

#### Faculty

William C. Richardson, Chairman; Alberts (Finance, Business Economics, and Quantitative Methods), Benoliel (Comparative Nursing Care Systems), Bergman (Pediatrics and Health Services), Blackman (Health Services), Bracht (Social Work), Grey (Urban Planning), Gross (Sociology), Johnson (Management and Organization), Lagace (Health Services), Lyden (Public Affairs), McCaffree (Economics and Health Services), Miller (Urban Planning), Morrill (Geography), Patti (Social Work), Pealy (Public Affairs), Phillips (Family Medicine), Richardson (Health Services), Rosenzweig (Management and Organization), Saxberg (Management and Organization), Schneider (Urban Planning), Seifert (Health Services), Shipman (Public Affairs), Williams (Public Affairs). Thomas R. Seifert, graduate program adviser; Allan Blackman, alternate graduate program adviser.

#### Master of Health Administration Degree

A two-year program of studies leading to the degree of Master of Health Administration is offered by the faculty in the interdisciplinary Health Services Administration and Planning Group of the Graduate School. Administrative offices are located in the Department of Health Services, School of Public Health and Community Medicine. The program accommodates degree candidates in any one of three areas of specialization: hospital administration, medical care administration and organization, and comprehensive health planning. The curriculum is designed to be highly interdisciplinary, with a faculty drawn from several academic units within the University.
Admission Requirements: Admissibility to the Graduate School, including a bachelor's degree from an accredited college or university with at least a 3.00 gradepoint average for the last two years of undergraduate work; successful performance on either the Graduate Record Examination, Admission Test for Graduate Study in Business, or the Miller Analogies Test in conjunction with the Doppelt Mathematical Reasoning Test; a narrative statement regarding the applicant's objectives; three letters of reference; and, for applicants who pass initial screening, final selection interviews by members of the program faculty for their designees. In general, applications are accepted only for Autumn Quarter of each year.

Graduation Requirements: Degree requirements include three quarters of study with emphasis on multidisciplinary basic discipline and methods courses following distribution requirements established by the program; introductory health services courses; a summer internship at an institution, agency, or program appropriate to the applicant's Program of Study; and an additional three quarters of health services core courses, 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, F351 Health Sciences, SC-37, Seattle, Washington 98195.

# PHYSIOLOGY PSYCHOLOGY

333A Guthrie

#### Faculty

Moncrieff H. Smith, Jr., Chairman. *Psychology*—Earl B. Hunt, Chairman; Makous, Rose, M. Smith, Teller, Woods. *Physiology and Biophysics*—Harry D. Patton, Chairman; Luschei, Miller, O. Smith, Stevens, Towe. Moncrieff H. Smith, Jr., graduate program adviser.

This interdisciplinary program administered by the Physiology Psychology Group of the Graduate School has been designed to meet a need for intensive training in the overlapping area of the behavioral and the physiological sciences. Currently, physiology and other departments of medical schools are appointing psychologists to carry on certain types of physiological research and to teach medical students. Psychology departments long have felt the need for individuals more highly conversant with physiological techniques and concepts than is usual for Ph.D.'s in psychology. Further, because physiological psychology is a fruitful research field, numerous research institutes are seeking persons trained in both disciplines.

Individuals could obtain a Ph.D. degree in each subject. In practice, this is rarely feasible, with the result that individuals in physiological psychology and in behavioral neurophysiology usually are less than adequately trained in one or the other of the parent disciplines. Therefore, it is the aim of the faculty in psychology and the faculty in physiology to work jointly to offer graduate students intensive training in the large area of overlap between the discplines.

The program of each student is supervised by a committee of four faculty members. Each student is expected to do laboratory work in both areas in order to become familiar with current research techniques in the respective departments. Although no formal master's degree program is provided, each student is expected to do independent research in either one discipline or the other prior to undertaking a doctoral research program.

Each student spends approximately a year in basic course work in each discipline. At the conclusion of these two years of study, the student's training consists of advanced seminars in either area, and doctoral research.

Because physiological psychology and neurophysiology are strongly developed at the University of Washington, the graduate student finds the latest in instrumentation and research techniques in both fields.

In addition to the facilities of both the physiology and psychology departments, students have the opportunity of working with laboratory primates at the Regional Primate Center. The center has facilities for a wide variety of behavioral and physiological studies of a number of primate species. Because primates offer unique advantages for both the behavioral and the physiological work, the center is a valuable adjunct to the resources of the training program.

# RADIOLOGICAL SCIENCES

### Faculty

Kenneth L. Jackson, Chairman; Bichsel (Radiology), Christensen (Radiology), Fairhall (Chemistry), Figley (Radiology), Gordon (Biochemistry), Moulton (Chemical Engineering), Nelp (Radiology), Robkin (Nuclear Engineering), Roman (Genetics), Seymour (Fisheries), Wolf (Pathology), Wootton (Radiology). Kenneth L. Jackson, graduate program adviser.



The program leading to the degree of Master of Science in Radiological Sciences is offered by the Radiological Sciences Group of the Graduate School. Study for this degree is open to students with baccalaureate degrees in a physical or biological science or in engineering, depending on the option selected. Several curriculum options are offered to satisfy different requirements and interests of biological scientists, physical scientists, or engineers. The various options described below prepare students for careers in health physics, radiological health, radiological physics, radiation biology, or hospital physics.

Thesis topics include studies in radiation biology, radioecology, nuclear medicine, radiochemistry, radiation physics, or nuclear engineering. Opportunity for research in the Hanford Laboratories of the United States Atomic Energy Commission also may be provided by special arrangement.

A student with a deficiency in one area of the prerequisites may be accepted for the program, provided he or she removes the deficiency during the first year of graduate study. Credit toward the degree is not ordinarily granted for a course used to remove a deficiency.

### PHYSICAL SCIENCE OPTION

Prerequisites for this option include a bachelor's degree in a physical science or in engineering, and a year of general biology at the college level.

Courses	· · · · ·	Cre	dits
PHYS 431, 433	Modern Physics Laboratory (3,3)		6
NUCE E 484	Introduction to Nuclear Engineering		4
NUC E 485	Nuclear Instruments (3)		
	or		
CHEM 410	Radiochemical Techniques and Radioactivity		
	Measurements (3)		3
NUC E 477	Introduction to Radioactive Tracer	•	•
	Techniques		3
FISH 473	Aquatic Radioecology II		3
RADGY 501-5	502 Biological Effects of Ionizing Radiation		2-2
RADGY 503-5	604 Laboratory in Radiation Biology.		1-1
RADGY 507	Radiation Hazards Analysis and Control		1
PADGY 517	Radiation Desimetry	•	â
	Radiatori Dosinicuty.		
KAD 5 520	Radiological Sciences Seminar	i, ma	IX. 0
RAD S 700	Master's Thesis	•	9

#### BIOLOGICAL SCIENCE OPTION

Prerequisites for this option include a bachelor's degree in biological science, courses in mathematics through differential and integral calculus and statistics, and chemistry through quantitative analysis and organic chemistry.

Courses	С	redits
500-level course in a biological science	•	3
RADGY 503-504 Laboratory in Radiation Biology		1-1
RADGY 505 Radiological Physics		2
RADGY 507 Radiation Hazards Analysis and Control .		. 1

FISH 473	Aquatic Radioecology II	3
CHEM 350, 3	51 Elementary Physical Chemistry 3,	3
CHEM 410	Radiochemical Techniques and Radioactivity	
	Measurements	3
PHYS 221	Quantum Physics	3
RAD S 520	Radiological Sciences Seminar 1, max.	6
RAD S 700	Master's Thesis	9

### ENVIRONMENTAL SCIENCE OPTION

An applicant with a bachelor's degree in a physical science or engineering and a year of general biology at the college level generally will be prepared to pursue this curriculum.

Courses		Cı	redi	its
CEWA 455	Ecological Effects of Waste Water	•	•	4
FISH 473	Aquatic Radioecology II	•	•	3
CEWA 401	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	۱.	2-	-2
RADGY 503-	504 Laboratory in Radiation Biology	•.	1-	-1
RADGY 517	Radiation Dosimetry	•	•	4
RAD S 520	Radiological Sciences Seminar		1	,1
RAD S 700	Master's Thesis		•	9

### MEDICAL RADIATION PHYSICS OPTION

Prerequisites for this option include a bachelor's degree in a physical science or engineering.

Courses		Credits
CONJ 400	Human Anatomy and Physiology	. '. 9
P BIO 437	Computer Programming for Biological	
	Research	3
<b>RADGY 501-</b>	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 1	, max. 6
RAD S 600	Independent Study or Research (Hospital	
	Physics Board Certification Related Experien	ce) 3
RAD S 700	Master's Thesis	. 9
	•	

# RUSSIAN AND EAST EUROPEAN STUDIES

503 Thomson

#### Faculty

Peter F. Sugar, Associate Director; Augerot, Boba, Coats, Ellison, Gershevsky (emeritus), Gribanovsky, Hagglund, Haney, Jackson, Kapetanic, Konick, Kramer, Legters, Micklesen, Paul, Reshetar, Romanowski, Scherr, Spector (emeritus), Swayze, Szeftel (emeritus), Thornton, Treadgold, Trnka, Velikonja, West, Waugh. Peter F. Sugar, graduate program adviser.

Russian and East European Program, administered by an interdisciplinary group of the Graduate School, offers courses that lead to the Master of Arts degree. The program faculty, consisting of specialists drawn from a number of cooperating departments and from the Institute for Comparative and Foreign Area Studies, offers specializations in Russian regional studies and in East European regional studies. Inquiries concerning these specializations and requests for applications for admission should be addressed to the graduate program adviser.

Complete course listings and additional information appear in the catalog offerings of the Institute for Comparative and Foreign Area Studies, or of the departments of Economics, Geography, History, Political Science, Slavic Languages and Literature, and Asian Languages and Literature.

### RUSSIAN REGIONAL STUDIES

Admission Requirements: The aspirant must meet the requirements of the Graduate School as outlined in the "Graduate Study" section of this catalog. An undergraduate grade-point average of 3.00 in the junior and senior years is a minimum prerequisite, but not a guarantee of admission. Presentation of the scores of the aptitude section (verbal and quantitative) of the Graduate Record Examination is strongly recommended.

*Program Requirements:* Language training is an essential component of the program. Aspirants must have the equivalent of six quarters (30 credits) of instruction in Russian at this university and, as candidates, must complete language training through the fourth year (an additional 30 credits). Students are encouraged to take as much instruction in Russian as possible, including summer intensive courses.

To graduate, the aspirant must complete the equivalent of 39 credits of work in interdisciplinary courses other than language, to be selected as follows: (1) 15–20 credits in area-oriented courses determined in consultation with the adviser in the discipline or topic of concentration. At least 9 credits to be taken in courses numbered 500 or above. (2) 10–15 credits in at least two additional disciplines. (3) 9 credits of thesis. (4) In addition, candidates must qualify for the master's degree by taking a written examination in the discipline(s) they have selected within the program and an oral interdisciplinary examination on the area of concentration; and by submitting to his or her major professor(s) an acceptable thesis three months from the date of the examination. This deadline may be extended under special circumstances on petition by candidates.

### EAST EUROPEAN REGIONAL STUDIES

Admission Requirements: The aspirant must meet the requirements of the Graduate School as outlined in the "Graduate Study" section of this catalog. An undergraduate grade-point average of 3.00 in the junior and senior years is a minimum prerequisite, but not a guarantee of admission. Presentation of the scores of the aptitude section (verbal and quantitative) of the Graduate Record Examination is strongly recommended.

Program Requirements: Students who plan to enter the program with previous training in Russian, German, or French already possess a valuable asset. However, knowledge of an East European language other than Russian is essential. To meet the requirements of the program, the aspirant must have a knowledge of two languages, of which one must be a language of the area (exclusive of French, German, or Russian); the second language may be either an additional language of the area or a nonarea language that is useful to the area of concentration. Language competence in the two languages may be satisfied either by passing the Language Proficiency Test or by the equivalent of two years training (30 credits for each language).

To graduate, the aspirant must complete the equivalent of 39 credits of work in interdisciplinary courses other than language, to be selected as follows: (1) 15-20 credits in area-oriented courses determined in consultation with the adviser in the discipline or topic of concentration. At least 9 credits to be taken in courses numbered 500 or above. (2) 10-15 credits in at least two additional disciplines. (3) 9 credits of thesis. (4) In addition, candidates must qualify for the master's degree by taking a written examination in the discipline(s) they have selected within the program and an oral interdisciplinary examination on the area of concentration; and by submitting to his or her major professor(s) an acceptable thesis three months from the date of the examination. This deadline may be extended under special circumstances on petition by candidates.



# INTERSCHOOL OR INTERCOLLEGE PROGRAMS

# BIOENGINEERING

328 Aerospace Research Laboratory

### Faculty

Robert F. Rushmer, Director; Allen S. Hoffman, Assistant Director; Chimoskey, Holloway, Huntsman, Johnson, Moritz.

Bioengineering provides a comprehensive multidisciplinary program of research and education. The concepts and techniques of engineering are applied to problems of biology and medicine through collaboration among the many disciplines of engineering and health sciences.

### **Undergraduate Programs**

Programs of study for engineering students are individually tailored to career objectives and may be accomplished by either of two pathways: (1) adherence to a traditional engineering department program using electives to cover bioengineering and health sciences courses; (2) adherence to a Bachelor of Science in Engineering degree program providing wider latitude in course requirements as approved by the Interdisciplinary Engineering Studies Group and the student's adviser.

### **Graduate Study**

In consultation with departmental and bioengineering advisers, graduate students may develop programs conforming to their career objectives. This may be done by enrolling in one of the traditional departments or by formulating an individualized program under the auspices of the Inter-Engineering Group of the College of Engineering. Available are courses and thesis topics that are oriented toward the application of engineering technology to problems of biology and medicine. Most programs emphasize combining advanced engineering principles and techniques with substantial biological and health sciences studies. Current collaborative projects involve most departments of engineering and many health' sciences divisions. Major areas of current research include bioinstrumentation, biomaterials, biomechanics, clinical engineering, computer applications, fertility studies, wave energies, and diagnostic ultrasound.

# MARINE STUDIES

Establishment of the Institute for Marine Studies in September, 1972, was the Board of Regents' response to an increasing interest among faculty and students in having more comprehensive and interrelated study and research about contemporary marine problems. Relying on new interdisciplinary courses of study and research approaches, the institute is supported by the strength and breadth of marine programs at the University, which has a long history of involvement and accomplishment in marine education and research. In keeping with the breadth of its concerns, the institute is administered through the University's central marine affairs policy-making group, the Marine Affairs Board, which is composed of deans and senior administrators.

The institute is designing an academic program and curriculum in marine studies and expects to secure authority to grant graduate degrees in this field. The proposed program is intended to meet the needs and interests of students in (1) policy and institutional problems of the oceans, including those that combine natural sciences and engineering with law, economics, international affairs, and public, administration; (2) applied science and engineering problems that couple scientific knowledge with well-defined social or economic needs, including resource and technology management, multidisciplinary and systems approaches, and assessment functions associated with environmental impact analysis; and (3) broader perspectives that surround chosen areas of subject-matter specialization in existing disciplines of natural science, engineering, and fisheries, and combinations thereof that have not been systematically integrated.

Advanced marine study also can be undertaken as a major or minor field of emphasis in a number of diverse programs offered at present in the following University units:

Atmospheric Sciences, Business Administration, Economics, Engineering, Fisheries, Food Science, Geography, Geological Sciences, Law, Oceanography, Political Science, Public Affairs, Quantitative Science, Sociology, and Urban Planning.

Additional information concerning the institute program may be obtained from Richard H. Fleming, graduate student adviser.

# UNIVERSITY CONJOINT

University Conjoint courses are offered cooperatively through interschool or intercollege programs. They are listed under "Interschool or Intercollege Programs" in the "Description of Courses" section of this catalog.

# QUANTITATIVE SCIENCE

Faculty

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Benjamin A. Jayne, Director; Bare; Bevan, Bledsoe, Chapman, Fletcher, Gallucci, Hatheway, Mathews, McCaughran, Rajagopal, Schreuder, Sollins, Swartzman, Turnbull, Walsh, Winter.

### **Adjunct Faculty**

Mar, Meier, Newell.

The Center for Quantitative Science in Forestry, Fisheries, and Wildlife is an intercollege academic unit sponsored by the College of Forest Resources and the College of Fisheries. The center offers a broad program in applied mathematics and in mathematical services directed principally to the two resource colleges, and to other life science departments of the University. The center's applied mathematics program is concerned with quantitative descriptions of the management of both aquatic and terrestrial ecosystems.

The applied mathematics program of the center consists of six areas of course offerings: (1) computer programming, with particular emphasis on problems of the management of living resources; (2) quantitative ecology, including population, community, and systems ecology; (3) physical processes in biological systems, emphasizing mass and energy transport in ecosystems; (4) operations research, with particular focus on the utilization of renewable resources; (5) applied statistics, with special emphasis on statistical inference and experimental design for the biological sciences; and (6) applied analysis, consisting of differential mathematics applied to the life sciences. Courses in each of the six areas are interrelated in a way that meets a wide range of student interests and needs.

The faculty participates in the research activities of several academic units of the University. In addition to the two resource colleges, these include the College of Engineering, the College of Arts and Sciences, the departments of Economics, Geography, and Oceanography, and the graduate schools of Business Administration and Public Affairs.

Both the teaching and the research programs of the Center for Quantitative Science are designed to bring together living systems, mathematics, and the computer for purposes of description and management. Particular emphasis in placed on the use of the computer for quantitative descriptions of both terrestrial and aquatic ecosystems and resource management. Computerization makes possible study of the impact of exploratory management policies on simulated resource systems embedded in backgrounds of interrelated physical, biological, and economic activities and under numerous institutional constraints. Such computer-based models have been successfully employed in the descriptions of complex ecosystems and in the management of forest



stands, the control of insect pests, and the management of fish and aquatic mammal stock.

# WILDLIFE SCIENCE

Chairman Donal E. Bevan

The colleges of Fisheries and of Forest Resources, through the Wildlife Science Committee, jointly administer an undergraduate degree program in wildlife.science. This interdisciplinary program requires training in biological and quantitative science as well as work in fisheries and forest resources. The student in forest resources who obtains a degree of Bachelor of Science in Forest Resources with a major in wildlife science will be able to apply his training to management of wildlife resources and the related environment, or he may proceed to do graduate work for advanced management or to fill a research position. An undergraduate interested in this field may find it desirable to major in one of the other curricula of the college, where he may select an elective concentration in wildlife science. Additional information may be obtained from the Chairman, Biological Sciences Division, 104 Winkenwerder.

# SOCIAL MANAGEMENT OF TECHNOLOGY

428 Aerospace Research Laboratory

Faculty

Edward Wenk, Jr., Director; Flajser, Lee, Porter.

### **Advisory Faculty**

Carlson, Crutchfield, Day, Flathman, Fleagle, Marcus, Wolfie.

Social management of technology refers to the study of the assessment of society's disparate technological needs and wants, of the sociopolitical, legal, and market processes by which policy is developed to satisfy these needs, of the public and private institutions that apply their specialized capabilities to meeting the goals established by society, and of their policy-level decision mechanisms.

The program is administered through a committee of deans from the College of Arts and Sciences, the School of Business Administration, the Graduate School of Public Affairs, and the Graduate School, with the Deán of the College of Engineering serving as chairman.

The widely recognized influence of technology on society has opened new challenges for guiding technologies more effectively, both to extract intended benefits for mankind and to minimize undesirable side effects. The problems involved in analyzing and managing technological systems, particularly in the public sector, have created a demand for a new professional. The program in the social management of technology aims to fulfill this demand in two ways: (1) to complement an individual's primary skills with a policy focus to enable the professional, such as an engineer, to work effectively on matters involving policy; and (2) through education and research, to prepare persons to specialize in technology policy per se, drawing upon disciplinary training but with a primary interest in technological policy analysis or policy making. Such endeavors require a knowledge not only of scientific and engineering principles but also of behavioral and social sciences and law for comprehension of processes and institutions by which technology is implemented, of humanities that give expression to our pluralistic society's value preferences, and of associated techniques of analysis that facilitate technology assessment.

This program is committed to a principle of contact and experience in the real settings where technology policy is generated. It is also committed to a group practice of scholarship by faculty and students as an essential mechanism for synthesizing disciplinary contributions when dealing with the complexities of technology management.

The program is an interdisciplinary, interschool, and intercollege effort with its most developed ties to the College of Engineering and the Graduate School of Public Affairs. It draws upon both a full-time faculty in social management of technology and a part-time faculty with appointments in such disciplines as aeronautics and astronautics, business administration, civil engineering, economics, health sciences, law, mechanical engineering, natural sciences, political science, and public affairs. Thus the program contributes to strengthening the science and public policy dimension of the other professional schools, of the social sciences, and of the institutes for Marine Studies, Environmental Studies, and Governmental Research.

At present, the number of courses and undergraduate and graduate degree programs are being enlarged with assistance of a Sloan Foundation Grant intended to emphasize the framework of public policy considerations within which engineers apply technology.

### **Undergraduate Studies**

Students enrolled in any schools or colleges of the University may select courses from, or may minor in, this program to enrich their general appreciation of the in-

teraction of technology and society or to expand their comprehension of public policy aspects in the application of their specialized disciplines. Students in engineering whose interests embrace interdisciplinary aspects of technology, such as environmental law, public administration, and long-range planning, will find the Bachelor of Science in Engineering degree programs flexible enough to meet educational goals. Under development is a double major curriculum that combines concentration in one field of engineering with public policy aspects of technology.

Opportunities will be available for work-study programs in cooperation with local industry and government.

#### **Graduate Studies**

Graduate students specializing in social management of technology come from atmospheric sciences, business administration, economics, engineering, fisheries, geography, oceanography, physical and biological sciences, political science, and public affairs. Course offerings are designed for students who want (1) to deal with policy, institutional, and decision-making processes in social management of technology; (2) to study social, economic, and environmental impact of applications of natural science or engineering; or (3) to broaden their perspectives of the role of technology in modern society.

Graduate students may formulate their individual programs in several ways, but all programs require student enrollment in an established school or college. Students may (1) employ studies in the social management of technology area to augment a major elsewhere in the University; (2) select science and technology policy as one of the degree options for the Master of Public Administration degree in the Graduate School of Public Affairs; (3) utilize the flexibility of established master's and doctoral programs in the College of Engineering to develop courses of study tailored to meet student interests that cross departmental or college lines (e.g., the Inter-Engineering Group in the "College of Engineering" section of this catalog); or (4) make special arrangements with other departments on an individual basis.

Internship arrangements are being developed in cooperation with industry and governmental bodies to provide opportunities for technology policy research. Under direction of the faculty of Social Management of Technology or the faculty of the College of Engineering and other disciplines, some research support is available for this program to provide assistance to graduate students working on theses in this interdisciplinary area.

### **Course Work**

The program offers courses at both the undergraduate and graduate levels. They deal with such topics as technology assessment, energy policy, technology policy analysis, and institutional means of regulating technology. These are listed in the "Description of Courses" section of this catalog as SMT 498, 499, 520, and 599. In addition, offered through other departments are several courses that deal with the area of technology and public policy. These include CIVE 540, 541, 542, or PB PL 540, 541, 542, and PB PL 583, 584, 585.

#### Dean

Richard S. L. Roddis 336 Condon

#### **Associate Deans**

Robert S. Hunt 306 Condon

Charles Z. Smith 322 Condon

#### Faculty

Andersen, Burke, Chisum, Corker, Cosway, Cross, Dybwad, Fletcher, Gallagher, Harsch (emeritus), Hardisty, Henderson, Hjorth, Hunt, Huston, Johnson, Junker, Kummert, Lyness, Meisenholder, Millar, Morris, Nottelman (emeritus), Peck, Price, Prosterman, Rieke, Roddis, Rombauer, Seawell, Shattuck (emeritus), C. Z. Smith, F. W. Smith, Stoebuck, 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 co-curricular activities, including the Student Bar Association, affiliated with the American Bar Association; a chapter of the National Lawyers Guild; a comprehensive program of legal services to prisoners of McNeil Island and Monroe State Reformatory; an extensive moot court program; a nationally recognized law review; chapter of the Order of the Coif and three national law school fraternities; an active Minority Law Student Association; opportunity for limited practice before the Washington courts for those students who have completed two of the three years of law school; and a legal-aid program.

The school has limited financial aid available, principally for second- and third-year students. Consisting of both grants and loans, it usually is dispensed on the basis of need.

A school-maintained placement service assists students in finding legal positions upon their graduation, in finding law-related summer jobs, and in qualifying for legal internships under the Washington court rules.

### Programs of Study Juris Doctor Degree

The Juris Doctor degree is conferred upon a student who has met the residence requirements, consisting of nine quarters of at least 12 credits each, and has earned at least 135 credits satisfactory to the School of Law.

As in most law schools of the United States, the first-year courses are required and are designed to introduce students to basic legal skills, foundational subject matter, and the variety of public and private processes with which the profession is concerned. Those courses are Contracts, Torts, Property, Civil Procedure, Criminal Law, Administrative Law, and Legal Research and Analysis.

Courses in the second and third years are elective, and a student may choose a program designed to suit his or her interests and needs. Only the course in professional responsibility and a seminar are required during these two years. In addition, LAW 600, Independent Study or Research, and LAW 605, Research and Writing, are available to students interested in pursuing individual projects. The seminar program is built on the belief that an opportunity for sustained research, analysis, and writing at an advanced level is an important part of preparation for the contemporary legal profession. The intended product of the seminar is a high-quality paper from each student.

### **Postgraduate Degrees in Law**

Applicants for admission to the postgraduate (postgraduates in law are graduate students in the Graduate School) programs in law must meet the requirements of the faculty in law as well as the requirements of the University Graduate School, and each student should familiarize himself with the general policies, procedures, and regulations of the Graduate School. Statements about admission, scholarship, residence, continuous enrollment, general master's and doctoral degree requirements, and other pertinent information may be found in the "Graduate School bulletin, entitled Graduate Study and Research.

Admission applications may be obtained by writing: University of Washington, Director of Admissions, 320 Schmitz, PC-30, Seattle, Washington 98195.

### Master of Laws Degree

Admission to the Master of Laws (LL.M.) degree programs, with specialization in Asian Law or in Law and Marine Affairs, is limited to applicants who have received the first professional degree (LL.B. or J.D.) in the United States or in another common law country and who have a record of superior academic achievement. In the case of the Asian Law emphasis, the applicant must be admitted to practice and must be bilingual in English and Japanese or in English and Chinese. Both programs contemplate one year in residence, to include at least 36 credits and an acceptable major research undertaking.

### Doctor of Philosophy Degree

Admission to the Ph.D. degree program in Asian Law is limited to exceptional scholar-lawyers who are bilingual (English and either Chinese, Japanese, or Korean). The core of the program is a major creative research project using Asian language sources as well as English language sources. At least two, and usually three, years in residence is necessary in order to accomplish the work that must be done in order to pass the General Examination that precedes candidacy for the doctoral degree. An acceptable dissertation must thereafter be submitted to complete the degree requirements. The Candidate may spend a year abroad while working on the dissertation, but must be in residence during the quarter in which the degree is to be received.

### Summer Quarter

The School of Law offers a number of courses during Summer Quarter for its own students, for students from other law schools who have completed at least one year of law study, and, in limited numbers, for nonlaw students. Summer Quarter courses also are available on a nonmatriculated basis for practicing lawyers who desire structured instruction in areas of expanding significance.

### Admission

Beginning students may enter the school only in Autumn Quarter, and they are required to be present a few days early to participate in the Foundations of Law Program.

Applicants for admission must present a baccalaureate degree from an approved college or university and also must submit a score on the Law School Admission Test.

Details about admission to the School of Law appear in the current University of Washington bulletin School of Law, available from the admission office of the School of Law. Applications for admission must be received by February 1 of the year in which the applicant desires to enter.

It is recommended that applicants for admission obtain a copy of the *Prelaw Handbook* published by the Law School Admissions Council. It contains much valuable information on the legal profession, prelegal education, and the law schools of the United States. It also contains a complete Law School Admission Test to familiarize the applicant with the kind of examination he will be required to take.



# LIBRARIANSHIP

Director

Peter Hiatt 133 Suzzallo

Acting Associate Director Mae Benne

133 Suzzallo

## Faculty

Ahlers, Bauer (emeritus), Benne, Bevis (emeritus), Gallagher, Lieberman, Mignon, Milczewski, Nelson, Page, Shaw, Skelley, Smith, Soper, Turner (emeritus). Peter Hiatt, graduate program adviser.

Established in 1911 in response to the need for professionally qualified librarians, the School of Librarianship is one of more than fifty schools that offer programs accredited by the American Library Association. Degrees granted are the Master of Librarianship and the Master of Law Librarianship, which are designed to prepare students for professional programs in many types of libraries.

The basic professional curriculum, including the prerequisite courses, is organized around a group of studies designed to provide a sound foundation in principles and methods, and is required of all students pursuing a graduate degree in librarianship. In addition, students select courses that will prepare them for special fields of library service such as those designed for children, for young adults or adults, for information science, and for law librarianship. Other programs may be designed in accordance with needs of the individual student, which may include his or her choice of type of library and undergraduate subject major.

Librarianship is a 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 approval of both the Graduate School and the School of Librarianship is necessary for admission to the graduate program. Students enter the school in Summer Quarter or Autumn Quarter only. The faculty admissions committee begins to examine applications in autumn for entrance to the school in the following summer and autumn. Early application is advisable.

A foreign student who holds a bachelor's degree from an institution in which the language of instruction is not English must submit a recent Test of English as a Foreign Language examination. A foreign student requires at least two years to complete the program and may enter only in the Autumn Quarter. To assure consideration of an application, it is advisable for a foreign student to submit complete credentials by February 1.

Enrollment as a graduate student is permissible while the four prerequisite courses are being completed. These courses do not carry graduate credit, but they are required before the student begins graduate-level courses in librarianship. These are LIBR 440, 441, 442, and 443. LIBR 441, 442, and 443 must be completed either simultaneously or in sequence.

Each of the four prerequisite courses carries 3 quarter credits, making a total of 12 credits. The courses are designed both to form a basic foundation for graduate work to follow and to serve as terminal library courses for students not seeking the graduate library degree.

Librarianship courses offered by other colleges and universities accredited by the Northwest Association of Secondary and Higher Schools may be articulated with the graduate program of the School of Librarianship. A student admitted from another accredited institution may be granted up to 12 quarter credits for courses completed, without a reduction in the required 45 quarter credits for the Master of Librarianship degree.

The entrance requirement of a modern foreign language may be met either by submitting one academic year of a modern foreign language at the college level, or its equivalent through placement beyond one year, or by passing the Graduate School foreign-language examination. Foreign students may submit academic credit in their national language or another modern foreign language, in addition to English. Any language deficiency must be removed prior to enrollment.

The applicant must submit results of a Graduate Record Examination aptitude test, (verbal and quantitative), taken within five years of the year of application.

Some familiarity with computer programming, statistics, or college algebra would be helpful for students preparing for a career in academic or special libraries, although this is not a requirement for admission to the program.

### **Course Requirements**

Those enrolled in the Master of Librarianship program must complete 45 quarter credits of graduate course work in addition to the 12 quarter credits of prerequisites. Students planning a full-time program should seek admission to begin work on prerequisites in Summer Quarter. An additional four quarters of graduate work is generally required for the degree.

Required courses to be completed include LIBR 502 or 454, 515, 516, 535, and 599, although not in that sequence. Other courses may be required, depending on the student's area of specialization.

### Summer Program

The full program for the Master of Librarianship degree is available to Summer Quarter students. The prerequisite and required courses are offered every summer. Elective course offerings vary from year to year, but are planned to enable students to complete requirements for the degree by attendance during summers only.

### Law Librarianship

An applicant for entrance to the law librarianship program must hold a degree from an accredited American law school or from a law school in one of the other common-law countries. Because specialized law librarianship courses are not offered during Summer Quarter, requirements for the Master of Law Librarianship degree must be completed in the consecutive quarters of the regular academic year. Prerequisite courses are, however, offered during Summer Quarter.

## **Library Facilities**

The School of Librarianship is in the south wing of the Suzzallo Library. The professional materials of librarianship, including an outstanding collection of children's books and a high school library collection, are a part of the Suzzallo Library. These materials are supplemented by the library's central, undergraduate, and departmental research libraries containing almost two million volumes. In addition, the School of Librarianship has the William E. Henry collection of rare books. Students have access to the facilities of the Pacific Northwest Bibliographic Center and the University's audiovisual services. The Seattle Public Library and the King County Library System are also available for student use.



# MEDICINE

# Dean Robert L. Van Citters A315 Health Sciences

#### Associate Deans

E. Harold Laws, John N. Lein, James W. Haviland, M. Roy Schwarz, Russell Ross, Francis C. Wood.

#### Assistánt Deans

Benjamin H. Belknap, Gary E. Striker, Loren C. Winterscheid.

The University of Washington School of Medicine is housed in the Health Sciences Center on the University campus. The schools of Dentistry, Nursing, and Public Health and Community Medicine also occupy this building. The basic health science departments located there provide educational services for the schools mentioned above as well as for many other schools and colleges within the University. The University Hospital is also a part of the health sciences complex.

Clinical teaching programs are conducted not only in the Health Sciences Building but also in the University Hospital and affiliated hospitals in the city and throughout the Pacific Northwest. The four major teaching facilities other than the University Hospital are Children's Orthopedic Hospital and Medical Center, Harborview Medical Center, United States Public Health Service Hospital, and Veterans Administration Hospital, all located in Seattle. The location of the School of Medicine assures opportunities for both students and faculty to participate in the total programs of a large university. The education of physicians and of all who are educated for careers in the health sciences cannot be narrowly viewed as purely a matter of professional training. As educated men and women, physicians are called upon to assume roles of leadership in their communities and in the nation. Students are therefore urged to participate in the general affairs of the University. The current curriculum, which went into operation in 1968, was designed with this goal in mind.

### The Curriculum

The curriculum is divided into two major divisions, the basic curriculum, which must be completed by all students who are candidates for the Doctor of Medicine degree, and the pathway curricula, which provide an opportunity for students to complete their degree requirements by taking courses in one of four prescribed pathways. Attainment of the M.D. degree is based upon credits earned and is not dependent upon a specific time requirement.

#### The Basic Curriculum

The basic curriculum has two parallel programs: the Lecture-Discussion Program and the Independent Study Program. Each covers the basic information prerequisite to the clerkship rotations in the University affiliated hospitals. The major differences between the two programs are the method of study and the time framework. In general, the basic curriculum is distributed over six quarters. In the Independent Study Program, the student proceeds at his own pace. In the Lecture-Discussion Program, capable students, who take a maximum load per quarter, may complete their degree requirements in ten to eleven academic quarters. Such students, by utilizing summer quarters, may finish their requirements in three years. Other students may proceed at a slower pace, taking four to five years to complete their requirements. The curriculum thus offers flexibility in educational experience and flexibility in individual programming.

The Lecture-Discussion Program in the medical sciences occupies the first six quarters. There are three general phases: pre--organ systems courses, organ systems, and introduction to clinical medicine, the last running parallel to the other two aspects. Clinical medicine begins in the first quarter and steadily assumes increasing prominence until the sixth quarter, when nearly half of the curriculum offerings are in this area. The first phase is designed to provide the background required for the organ systems courses and an insight into some of the many different aspects of the world of medicine. Among these experiences is an elective opportunity to spend one morning a week with a practicing physician at work in his office or clinic. The third, fourth, fifth, and sixth quarters are concerned with teaching the anatomical, physiological, and biochemical properties of the several organ systems of man. Emphasis is placed upon correlating these properties with clinical methods of data collection and upon derangements of function of these systems that illustrate the application of basic scientific principles to clinical medicine. During the introduction to clinical medicine, students are taught on the wards and at the bedside, their clinical skills being developed so they may be launched into their pathway programs with a fundamental knowledge of clinical medicine.

Students are expected to proceed through the basic curriculum during their first six quarters in the School of Medicine. The academic demands of the basic curriculum are scaled so that most students will be able to take elective courses in addition to the basic curriculum. Electives may be used to make up educational deficiencies, to broaden the student's background, or to begin the fulfillment of pathway requirements. No student is expected to undertake work in excess of 18 credits per quarter. Assumption of an academic load in excess of 18 credits requires special permission from the student's adviser and the Associate Dean for Academic Affairs. A student may decide to embark upon a specific pathway at any time, but is required to make a decision by the fifth quarter.

HOURS CREDITS FIRST OUARTER (AUTUMN) Introduction to medicine and the curriculum orientation . . . . . . . . 70 HUBIO 411 Anatomy HUBIO 412 Mechanisms in Physiology and 55 Pharmacology Introduction to Clinical Medicine HUBIO 413 15 Molecular and Cellular Biology I HUBIO 414 45 31/2 HUBIO 415 The Ages of Man . . . . . . 40 2 141/2 225 SECOND QUARTER (WINTER) Cell and Tissue Response to HUBIO 420 Iniury 62 4 Natural History of Infectious HUBIO 421 Diseases and Chemotherapy 72 41/2 Introduction to Clinical Medicine 11/2 HUBIO 422 36 System of Human Behavior I. 30 HUBIO 423 2 HUBIO 424 30 21⁄2 Molecular and Cellular Biology II 230 141/2 THIRD QUARTER (SPRING) 20 11/2 HUBIO 430 Epidemiology . HUBIO 431 Head, Neck, Ear, Nose, and Throat..... 40 21/2 HUBIO 432 Nervous System / . . . 80 51⁄2 HUBIO 433 20 11/2 Medicine, Health, and Society . . HUBIO 434 Endocrine System . . . 30 HUBIO 435 Introduction to Clinical Medicine 30 11/2 220 141/2 FOURTH QUARTER (AUTUMN) HUBIO 440 Cardiovascular-Respiratory 103 6 System HUBIO 441 Gastro-Intestinal System 31/2 62 HUBIO 442 35 11/2 Introduction to Clinical Medicine HUBIO 443 Medicine, Health, and Society . . 30 2 HUBIO 449 Genetics . . . . . . . . . . . . 10 1/2 240 131/2 FIFTH QUARTER (WINTER) HUBIO 450 80 Introduction to Clinical Medicine 31/2 HUBIO 451 Hematology . . . . . . . . . . . . 40 3 HUBIO 452 Urinary System 62 4 . . . . . . . . . HUBIO 453 Musculoskeletal System . . . . . 56 31⁄2 238 14 SIXTH QUARTER (SPRING) HUBIO 460 Introduction to Clinical Medicine 100 HUBIO 461 HUBIO 462 20 11/2 . . . . . . . . . . . 64 3 2 HUBIO 463 30 System of Human Behavior II . 71/2 HUBIO 465 <u>220</u> Basic Hospital Clerkship . . . 19 <u>434</u> Total credits

### Pathway Curricula

Four pathways are currently defined. Their general descriptions:

Family Physician Pathway: Physicians are trained to fulfill a role in our health care system that is in great demand and in short supply. These physicians assume responsibility for the overall health care of individuals of all ages. They are capable of making initial diagnoses and treating many illnesses. Their knowledge allows them to make decisions regarding the need for more specialized consultation and care. They are capable of resuming the care of patients who are treated for a time by specialists. These physicians are particularly skilled in utilizing all of the health service resources of their



community and region in the care of their patients. Their training emphasizes experience in ambulatory clinics and situations in which diagnostic and treatment facilities are used in caring for patients who need not be hospitalized. They learn to work with specialists in internal medicine, surgery, and psychiatry, and with public health nurses, social workers, diagnostic technicians, and other members of the health care team. Through coordinated teaching they follow patients through acute illness and into convalescence, so that the full impact of illness on the patient, his family, and his community can be appreciated.

Clinical Specialist Pathway: In modern medical practice, sophisticated application of scientific knowledge is of great importance in the diagnosis and treatment of many diseases. The specialties of internal medicine, pediatrics, and surgery have become highly diversified. The clinical specialist pathway provides the fundamental education for students who will develop into specialists in either internal medicine, pediatrics, or surgery. Emphasis is placed upon hospital experience and upon the knowledge of basic sciences essential to the rational application of scientific knowledge to clinical problems. Opportunities are provided for prolonged follow-up treatment of patients with chronic disease.

Behavioral Specialist Pathway: This pathway is intended to train physicians who will become specialists in those areas in which a sound knowledge of the nervous system and human behavior is essential. These include neurologists, neurological surgeons, and psychiatrists. Required is a firm grounding in hospital medicine; ambulatory clinic experience, particularly in psychiatry; and detailed education in the basic sciences relevant to the nervous system and behavior.

Medical Scientist Pathway: This pathway is designed to allow students who are highly motivated toward developing themselves as research investigators in medicine an opportunity to pursue simultaneously their education in the areas of scientific investigation and clinical medicine. The program allows time for a detailed development of knowledge in one of the basic sciences and a sound education in medicine. Because of the course demands and the need for prolonged periods of research training, five years are required to complete this course of study. The granting of a combined degree is under consideration. A Doctor of Philosophy or Master of Science degree from a basic science department may be obtained under existing rules of the Graduate School, but special arrangements must be made in each case.

In general, each pathway has certain absolute require-

ments, makes available an opportunity for the selection of courses from a defined list, and offers completely free elective choices. A minimum of 21 quarter credits of free electives is provided in each pathway, and 90 quarter credits are required in each, with the exception of the medical scientist pathway, which requires 135 quarter credits. The M.D. degree may be granted after the attainment of 180 quarter credits (90 basic curriculum, 90 pathway) in the prescribed distribution. For the medical scientist, 225 quarter credits are required.

The curriculum of the University of Washington School of Medicine is predicated on the assumption that all graduates will continue their training through several postdoctoral years of internship and residency. It is believed that the curriculum provides a maximum opportunity for the student to prepare himself to make a career choice and to develop his own-education toward the fulfillment of his chosen career.

### WAMI Program

As an integral part of the undergraduate medical curriculum intended to provide a broader range of educational opportunities for students, the University of Washington embarked upon an experiment in decentralized medical education in 1969. The WAMI Program, as it is called, drew its name from the states of Washington, Alaska, Montana, and Idaho. It provides students with the opportunity to receive the beginning portion of their medical education at the University of Alaska, the University of Idaho, Montana State University, or Washington State University, instead of at the University of Washington. Following this exposure all students return to the School of Medicine for the remaining portion of the basic curriculum. Once they have reached the pathway portion of the curriculum, students have the opportunity to receive a portion of their clinical training in communities under the supervision of practicing physicians within any of these four states. Included among the subdisciplines that have community-based learning experiences are family medicine, obstetrics and gynecology, internal medicine, psychiatry, and pediatrics. By capitalizing upon the assets of both the medical center setting and the community setting, students will develop broader backgrounds of experience and training than previously had been possible. They also have gained a better understanding of the spectrum of career opportunities that medicine has to offer.

#### **Admission Requirements**

The faculty of the School of Medicine believes that the appropriate level of scholarly achievement and preparation for medicine can best be developed in a liberal arts program with the emphasis on a major area of interest selected by the student in any field sufficiently demanding in scholastic discipline. No particular major is given preferential attention in selection.

Before admission each applicant must have completed the minimum requirements listed below and must have demonstrated his academic proficiency in these subjects by obtaining an acceptable grade-point average. In addition to the following credits, proficiency in English and basic mathematics is expected of every applicant. A bachelor's degree is encouraged, but it is not required for admission.

Biology, 12 quarter credits (8 semester credits); chemistry, 18 (12); physics, 12 (8).

In recognition of the diverse opportunities afforded the graduate in medicine, the specified requirements are purposely kept to a minimum. In this manner each student has the opportunity to pursue, as his major field of study, any area of special interest to him—the physical sciences, biological sciences, or humanities—and still acquire the intellectual skills necessary for the regular medical curriculum. Throughout the medical program, elective time as well as time for research and thesis affords the student an opportunity to apply the knowledge and concepts acquired in his major field to the appropriate areas of medicine.

Applicants are urged to discuss undergraduate credentials and curriculum with a premedical adviser at their undergraduate institution.

### **Application Procedure**

The University of Washington is a participant in the American Medical College Application Service (AMCAS) Program. Applications may be obtained from AMCAS offices, 1776 Massachusetts Avenue Northwest, Suite 301, Washington, D.C. 20036. Because the admissions committee begins examining applications a year ahead of the time of entrance, early application is advisable.

Primary preference for admission is given to qualified residents of Washington. Second preference is given to qualified residents of Alaska, Idaho, Montana, and Wyoming, which have contractual arrangements for this purpose with the state of Washington and the University of Washington. Residents outside these regions, except for M.D.–Ph.D. and educationally disadvantaged applicants, are seldom considered. The mean grade-point average of students entering in 1972 was 3.50 with mean Medical College Admission Test (MCAT) scores approximately in the eightieth percentile per section. Washington, Alaska, Idaho, Montana, and Wyoming applicants must submit a three-hundredword autobiography (page 2 of the AMCAS Application may be used) and request that their premedical committee's evaluation be sent directly to the school. Evaluations of three science and two nonscience instructors may be substituted. Applicants must state by letter from whom recommendations should be expected, or if application is for the M.D.-Ph.D. program, or both. These letters must evaluate critically the candidate's academic ability, strengths and weaknesses, motivation for medicine, maturity, difficulty of course work attempted, and special attributes and assets. This supplemental information must be received by the school before an application can be processed. Nonresidents should not submit supplemental information unless requested to do so by the school.

These requirements must be met and MCAT results must be available before applications can be processed. The \$10 nonresident fee should not be submitted until requested, and it may be waived for economic reasons. Deadline is December 15 (early decision, September 1).

#### **Medical College Admission Test**

Each applicant must provide the scores received on the Medical College Admission Test. Arrangements for this test may be made with the premedical adviser at the institution at which premedical training is being taken. Medical aptitude tests are customarily given in May and September of each year. The MCAT *must* be taken by autumn of the year preceding the proposed date of the enrollment, with scores to be sent directly to the University of Washington School of Medicine admissions committee. Additional information on this test may be obtained from the American College Testing Program, P.O. Box 414, Iowa City, Iowa 52240.

### **Early Decision Program**

The School of Medicine participates in the Early Decision Program as formulated by AMCAS. Details of the program can be obtained from AMCAS, but it essentially provides that a small number of *highly qualified* applicants will have been accepted for a given class by October 1 of the *preceding* year. These applicants may apply only to the University of Washington. If a place is offered they must accept the offer or, if not accepted, they may apply to this and other schools under the regular program.

After consultation with their premedical advisers, applicants for consideration in the Early Decision Program must submit completed applications by September 1.

### Miscellaneous

It is the policy of this school not to accept for admission



students who have failed in other medical schools or who have been dismissed from them.

All applicants are given consideration on the same basis, regardless of race, color, sex, religion, or parental occupation.

Information concerning admission to the curriculum in physical therapy and in occupational therapy is included under the Department of Rehabilitation Medicine, and in medical technology under the Department of Laboratory Medicine.

### Transfer Students

Transfer students are admitted for clinical training into the third-year class in those rare instances in which vacancies develop in classes. Ninety credits are required for completion of the clinical training phase, but flexibility in programs is possible. Students should contact the admissions committee for the latest information.

When vacancies do occur, applicants from two-year medical schools are given preference. Transfer applications should be filed no later than March 1 of the proposed year of entry. Transfer students are not charged a fee. Each applicant must submit:

1. Formal application for admission on the form furnished by the School of Medicine.

2. One official transcript of premedical and medical training, which is sent directly to the admissions committee from the registrars of the institutions in which the training was taken.

3. Score received in the Medical College Admission Test.

4. Letter from the Dean of the medical school indicating the student's status and relative standing in his class.

Once admitted, transfer students must meet the same requirements for graduation as other medical students.

### Residency

Future classes are expected to consist only of Washington, Alaska, Idaho, Montana, and Wyoming residents and educationally disadvantaged students, regardless of residence. Other candidates are unlikely to be admitted, and, therefore, their applications will not be reviewed until all applicants as noted above have been considered. Upon review of an application, the admissions committee may request proof of legal residence. The Office of Residence Classification provides legal classification of Washington residency.

### **Processing of Applications**

*Evaluation of Credentials:* The admissions committee examines each applicant's credentials and bases its decisions on the objective evaluation of these factors: preprofessional training, evidences of scholarship, place of residence, Medical College Admission Test rating, and personal evaluation of the student by premedical instructors in their letters of recommendation.

*Personal Interview:* If an examination of the credentials shows them to be within the competitive group, the applicant may be requested to appear for a personal interview by the admissions committee. Interviews are by invitation only. Applicants who are in school a considerable distance from Seattle should inform the admissions committee, in advance, of the times when they may be in the Seattle area.

Notification of Acceptance or Rejection: Attempts are made to issue notices of acceptance on October 1 (early decision), January 15, February 15, March 15, and April 15. An acknowledgement of notification of acceptance should be made in writing by the successful applicant within two weeks.

Acceptance of Appointment: Within several weeks after an applicant has accepted the position offered him in the School of Medicine, the Registrar's Office of the University requests a deposit of \$50. This deposit is applied to the first quarter's tuition. If the student wishes to withdraw, the deposit is refundable before the deadline set by the Comptroller's Division of the University of Washington. After that date, the advance fee payment is not transferable to another person or quarter and is not generally refundable.

## Western Interstate Commission for Higher Education

The School of Medicine participates in the student exchange program of the Western Interstate Commission for Higher Education (WICHE), under which legal residents of certain Western states that do not have medical schools may pay the tuition and fees charged to legal residents of Washington State rather than the higher nonresident rate. These states are Alaska, Arizona, Idaho, Montana, Nevada, and Wyoming. To be eligible for this program, the student must be certified by his home state. State eligibility requirements vary, and the number of students who can be included in the program each year depends on appropriations by the legislatures. A student interested in this program must apply to the certifying officer in his home state, whose address may be obtained from the Western Interstate Commission for Higher Education, University East Campus, Boulder, Colorado.

Books and Supplies: The average annual cost for medical students is \$450 in the first year and \$250 each year thereafter. This includes books, equipment, microscope rental, and examination fees.

*Transportation:* Students are responsible for providing their own transportation and paying the parking fees required at the University and the several affiliated hospitals. Budgets should be planned accordingly.

### **Student Evaluation and Promotion**

Student evaluation is based upon the faculty's observations of the student's work and upon written papers and examinations. Periodic review of student progress is made, and students are informed of their deficiencies and their strong qualities. Dismissal from the school may occur if a student fails to maintain an acceptable academic record. Opportunities to make up unsatisfactory work are allowed at the discretion of the Dean and the executive committee of the School of Medicine. Dismissal also may occur if qualities of character and personality not deemed commensurate with a career as a physician come to light at any point. Once dismissal has occurred, readmission requires the approval of the executive committee of the School of Medicine. Readmission after dismissal is not considered unless there is substantial evidence that the problems causing dismissal have been resolved.

All students are required to pass parts 1 and 2 of the National Board of Examinations. They are also required to participate in special surveys and examinations directed toward the evaluation of student performance and of the educational objectives of the School of Medicine.

# Fees, Extra Service Charges, and Rentals

All fees, extra service charges, and rentals are payable in United States dollars upon demand. The University reserves the right to change any of its fees and charges without notice.

Medicine	Per Quarter
Full Time (more than 12 credits)	
Resident	\$280
Nonresident	\$613
Part Time (2–12 credits)	
Resident	\$148 <b>-</b> \$268
Nonresident	\$250\$580

Medical technology, physical therapy, prosthetics and orthotics, and occupational therapy fees are the same as general student fees (see "General Information" section of this catalog). Information concerning resident, nonresident, and veteran status can be found in the "Rules and Regulations" section of this catalog.

## **Financial Aid**

The lengthy training required to master the accumulated knowledge necessary to the practice of medicine has resulted in costs that seem prohibitive to many prospective students. No student interested in becoming a physician should be deterred from applying to the University of Washington School of Medicine for financial reasons. Both public and private endowments have been given to the school to provide financial aid to deserving medical students. During the academic year, scholarships, grants-in-aid, loans, and traineeships are available.

# **Application for Aid Procedures**

Unless otherwise specified, applications for fellowships, scholarships, and grants-in-aid should be directed to the Office of the Dean of Medicine before June 1 of each year. Application forms and related information may be obtained from the Office of the Dean of Medicine upon request. The student must be willing to submit a detailed and realistic analysis of his complete financial situation. In case of emergency or special need, an application for grant-in-aid may be made at any time. Application for a loan also may be made at any time to the Office of the Dean. Applications for assistantships should be made to faculty members. All payment of monies concerned with endowment awards, prizes, stipends, grants-in-aid, and loans are made by the University comptroller.

#### **Financial Assistance**

Scholarships have been established for entering students who are unable to finance their medical educations. Substantial loans are available to students in need of financial assistance to help cover costs of their medical education.

Outside employment is discouraged, and a number of scholarships and grants-in-aid are given with the stipulation that the student will not engage in remunerative employment without consent of the Financial Aid Committee. There exist a few opportunities in Seattle hospitals for part-time work for third- or fourth-year students. A limited number of research assistantships and fellowships are available in the summer months.

Stipends of the various scholarships, loans, and grants range from full tuition and fees to amounts sufficient to cover the entire financial needs of the student through four years of medical school.



### **Research and Training Grants**

Each year, grants from various public and private sources are received by individual faculty members and by the School of Medicine to support medical research and training in teaching and research. Extensive training programs, supported largely by the National Institutes of Health, provide training in teaching and research to individuals at the undergraduate, graduate, and postdoctoral levels.

## Traineeships

A traineeship is an academic award of honor based upon scholastic achievement and designed to aid and encourage the student in his studies or research. In cases in which the trainee collaborates with a faculty member, the trainee is expected to take the lead as principal investigator. The trainee is allowed freedom of publication of his results as a condition of the grant. He is expected to devote his full time and energy to his project and may not be otherwise gainfully employed during the period of his traineeship. Ordinarily, the traineeships cover the three months of a free quarter, often the summer.

### Assistantships

A number of positions with individual faculty members are usually available to medical students during the summer months. Most of these positions involve laboratory work on research projects.

### Honors

A charter as Alpha of Washington was granted to the School of Medicine in 1950 by Alpha Omega Alpha, the honorary medical fraternity. Members are elected by the membership of Alpha Omega Alpha on the basis of high scholarship and good moral character.

# Medical Thesis Program

The medical thesis program of the School of Medicine is voluntary, and participation in it is initiated by the student. Often a student will become especially interested in some particular field in medicine. This interest will lead him to a desire to learn more about the field or to do special work in it. The thesis program is a means of fulfilling his desire. A prize may be awarded for the best thesis submitted each year, and certain departments have available prizes for the best thesis written under that department's supervision. The preparation of a satisfactory thesis may carry with it honors in the department. Additional information concerning the thesis program may be obtained from the chairman of the Medical Thesis Committee or from the Dean's office.

#### Graduation With Honor

A degree of Doctor of Medicine with honor may be awarded to students with high achievement who, in addition, have demonstrated initiative and success in clinical and scholarly pursuits related to medicine. Evidence of such scholarly achievement may be represented by a thesis of acceptable quality, by a paper accepted for publication in a recognized scientific journal, by a scholarly analysis of a clinical subject comparable to review papers and case reports, or by nomination of the faculty.

# Academic Programs

### **Doctor of Medicine Degree**

Upon completion of the curriculum of the School of Medicine, the M.D. degree is awarded to candidates who (1) have given evidence of good moral character; (2) have satisfactorily completed the requirements of the basic and pathway curricula and have earned a minimum of 180 quarter credits (for transfer students, 90 quarter credits); (3) have fulfilled all special requirements; and (4) have discharged all indebtedness to the University.

### **Bachelor of Science Degree**

Programs leading to a bachelor's degree with a major in microbiology are offered through the College of Arts and Sciences. The programs are described in the "College of Arts and Sciences" section of this catalog.

### **Bachelor of Science in Medical Technology Degree**

The medical technology program is designed to train young men and women to be professional workers in hospital, clinic, public health, and medical research laboratories. The prescribed preparatory program consists of three years of regular university training with emphasis placed upon certain courses in chemistry and biology. This is followed by a twelve-month period of full-time instruction and training in medical technology itself. Information concerning the curriculum and admission to the program in medical technology appears under "Laboratory Medicine" in this catalog.

### Bachelor of Science in Physical Therapy Degree

A curriculum in physical therapy is offered by the Department of Rehabilitation Medicine in the School of Medicine. It provides professional training in the basic sciences and in the clinical use of accepted physical therapy modalities and procedures. Information concerning admission to physical therapy appears under "Rehabilitation Medicine" in this catalog.

### **Bachelor of Science in Occupational Therapy Degree**

A curriculum in occupational therapy is offered by the Department of Rehabilitation Medicine in the School of Medicine. It provides professional training in the basic sciences and the clinical use of occupational therapy. Information concerning admission to occupational therapy appears under "Rehabilitation Medicine" in this catalog.

### **Bachelor of Science in Prosthetics and Orthotics Degree**

A curriculum in prosthetics and orthotics leading to the degree of Bachelor of Science is offered by the Department of Rehabilitation Medicine in the School of Medicine. It provides professional training in the basic sciences and the clinical application, design, and fabrication of prostheses and orthoses. Information concerning admission to the curriculum in prosthetics and orthotics appears under "Rehabilitation Medicine" in this catalog.

### Master of Science and Doctor of Philosophy Degrees

Work leading to master's and doctoral degrees is offered, in accordance with the requirements of the Graduate School, in the departments of Biochemistry, Biological Structure, Microbiology, Pathology, Pharmacology, and Physiology and Biophysics. Master's degree programs are offered by the departments of Biomedical History and Rehabilitation Medicine. Students who work toward these degrees concurrently with the M.D. degree pursue the Medical Scientist Pathway.

In order to expedite the training of physicians who wish to specialize in public health or community medicine, the school has made available a program that leads simultaneously to the degrees of Doctor of Medicine and Master of Public Health. In most cases, the program can be completed in four years, provided that at least two summers are spent in course or research work, or both. In general, the concurrent degree program students pursue either the Clinical Specialist Pathway or the Family Physician Pathway. Students can elect concentration in any of four departments of the School of Public Health and Community Medicine: Biostatistics, Environmental Health, Epidemiology and International Health, or Health Services.

A student who intends to work toward a graduate degree should confer with the Chairman of the department in which graduate study is to be pursued. Specific requirements for admission to work for advanced degrees appear in the "Graduate Study" section of this catalog.

### **Medical Accreditation and Licensure**

The University of Washington School of Medicine is approved by the Association of American Medical Colleges, the Council on Medical Education, and hospitals of the American Medical Association. Admission to the practice of medicine in any state is conditional upon meeting the requirements of that state's board of examiners. Admission to practice in the state of Washington is dependent upon the candidate's having an M.D. degree, completing an internship, and passing the basic science and licensing examinations. Completion of the basic science requirements may be arranged through reciprocity with the National Board of Medical Examinations and with certain specified states.

Additional information about licensure requirements may be obtained from the Washington State Division of Professional Licensing, P.O. Box 649, Dept. 71175, Olympia, Washington 98504.

# **Postgraduate Medical Education**

### **Internships and Residencies**

Internships and other first-year postgraduate programs are available at the University of Washington Affiliated Hospitals-University Hospital, Harborview Medical Center, Veterans Administration Hospital, United States Public Health Service Hospital, and the Children's Orthopedic Hospital and Medical Center. All clinical departments participate in the training program for first-year trainees in one or more of these institutions. First-year training programs are available in the clinical fields of anesthesiology, general surgery, medicine, neurology, neurological surgery, obstetrics, gynecology, orthopaedic surgery, pathology, pediatrics, rehabilitation medicine, psychiatry, radiology, family medicine, laboratory medicine, radiation therapy, and urology. The residency programs vary in duration from two to five years and are integrated, providing for rotation through several of the University-affiliated hospitals during this period of training.

#### **Postdoctoral Fellowships and Traineeships**

Postdoctoral fellowships and traineeships are available in all departments. They are designed to provide further research and teaching experience for the advanced students who already have obtained their Ph.D. or M.D. degrees.

# CONTINUING MEDICAL EDUCATION

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Director John N. Lein E305 Health Sciences

The Division of Continuing Medical Education at the School of Medicine offers approximately twenty-five refresher courses of one- to five-day duration for prac-



ticing physicians and allied health workers. The programs are developed and presented by clinical and basic sciences faculty in cooperation with the Washington State Medical Association, federal and state agencies, physicians' organizations, and voluntary organizations.

Activities of the division are coordinated with a group of voluntary practicing physicians, the Continuing Education Community Coordinators, who advise the sponsoring organizations on educational needs, implement programs in their communities, and help to select topics and instructors. The coordinators are appointed jointly by the School of Medicine and the Washington State Medical Association.

The Division of Continuing Education has worked closely over the past five years with the Washington/Alaska Regional Medical Program to develop a multimedia approach to continuing medical education.

Courses focus on a review of fundamental concepts and recent advances in diagnosis and treatment in the spectrum of medical specialties and of health professionals (e.g., dietitians, medical technologists, physical therapists, and occupational therapists). A family practice review is held annually. Brochures for each course, listing dates, faculty, enrollment limitations, and tuition fees, are available from the Division of Continuing Medical Education.

The Postgraduate Preceptorship Project offers individualized refresher training for physicians at the University Hospital, at affiliated teaching hospitals, and at other community hospitals in the region.

An integral part of the WAMI Program is the support of the peripheral university and clinical faculties through continuing education. In addition, the community clinical units of the WAMI Program serve as models for the continuum of medical education and for the introduction of students to the prócess of quality assurance.

Physicians are welcome to participate in the regular rounds and conferences scheduled at the University Hospital and clinics and at the hospitals affiliated with the University's teaching program.

# ANESTHESIOLOGY

**BB1469** Health Sciences

### Faculty

John J. Bonica, Chairman; Thomas F. Hornbein, Vice Chairman; Aasheim, Akamatsu, Amory, Black, Burnham, Chapman, Cheney, Cullen, de Jong, Everett, Fink, Freund, Heavner, Horton, W. Kennedy, Martin, Mather, Murphy, Pflug, Pollack, Stanton-Hicks, Ward, Wetstone, Winter, Wong.

The Department of Anesthesiology has broad responsibilities for the teaching of medical students throughout their four years of undergraduate training. Departmental faculty participate in the teaching of applied anatomy to students during their first year. During the second year, faculty who also have joint appointments in physiology and pharmacology participate in the teaching of students in these areas. During the clinical years, students are taught basic principles of anesthesiology, including artificial respiration and resuscitation. Instruction is provided by lectures, conjoint courses, and clinical clerkships. In addition, the department has an active training program for interns and residents in anesthesiology and affords experience in anesthesiology to residents in surgery, obstetrics, and respiratory therapy, pain clinic.

# BIOCHEMISTRY

J405 Health Sciences

### Faculty

Hans Neurath, Chairman; Agabian, Bard, Bornstein, Byers, Davie, Deranleau, Fischer, Gordon, Hall, Hauschka, Herriott, Kaplan, Keller, Morris, Palmiter, Parson, Petra, Shapiro, Teller, Wade, Walsh, Young.

Biochemistry is the branch of the biological sciences in which the chemistry of life processes is studied.

### Academic Programs

There is no curriculum that leads to an undergraduate degree in biochemistry, but students who seek a Bachelor of Science degree in the field of biology (molecular and cell biology) enroll in biochemistry courses. The department offers the Master of Science and Doctor of Philosophy degree programs in biochemistry, with admission preference given students who seek the Ph.D. degree.

### **Admission Requirements**

An undergraduate degree in chemistry, physics, or biology. Overall grade-point average of 3.00 or higher, or equivalent, in the following required courses: calculus, general biology, general physics, organic chemistry, physical chemistry. Deficiencies may be remedied during the first year of graduate study. Graduate School requirements, which appear in the "Graduate Study" section of this catalog, should be consulted.

#### **Graduation Requirements**

Master of Science Degree: With thesis—36 credits. Without thesis—27 credits, of which one-half are in courses numbered 500 or above, must be completed within the first year.

Doctor of Philosophy Degree: A minimum of three academic years of study; dissertation; teaching experience as a teaching assistant or predoctoral teaching associate. An adviser may be consulted for additional information.

# BIOENGINEERING

BB1021 University Hospital

### Faculty

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Robert F. Rushmer, Director; Allen S. Hoffman, Assistant Director; Chimoskey, Holloway, Huntsman, Johnson, Moritz.

Bioengineering is a multidisciplinary program of collaborative research and training designed to accelerate adoption of new engineering technologies in applications to clinical practice and research.

Faculty and students in the health sciences may engage in studies of mutual interest with faculty and students in the College of Engineering through undergraduate, graduate, and postdoctoral programs. Information on bioengineering also appears in the "Interschool or Intercollege Programs" section of this catalog.

# **BIOLOGICAL STRUCTURE**

G511 Health Sciences

## Faculty

Newton B. Everett, Chairman; Adman, Amano, Blandau, Boling, Boyden, Broderson, Coates, Eddy, Fitzgerald, Gaddum-Rosse, Graney, Graubard, Halbert, Hamilton, Hampton, Hodsdon, Holbrook, Jensen, Kashiwa, Koehler, Landau, Lasher, Luft, Lund, Merchant, Nameroff, Naum, Odland, Park, Perkins, Prothero, Robson, Roosen-Runge, Rosse, Rumery, Schwarz, Sieker, Skahen, Stebbins, Sundsten, Szubinska-Luft, Tamarin, Watenpaugh, Weinke, Westrum. Cornelius Rosse, 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, Chairman; 'Sloan, Whorton. Charles W. Bodemer, graduate program adviser.

The history of medicine and biology represents an integral part of the history of Western civilization. Study of the history of biomedical sciences provides simultaneously a greater understanding of their relation to the social, economic, philosophic, and religious factors influencing, and influenced by, them at different times and places during their development. The biomedical sciences lend another dimension to history valuable to the scientist and nonscientist alike.

### Master of Arts Degree

The Department of Biomedical History offers a program of studies leading to the Master of Arts degree. Specific requirements for this degree may be obtained by contacting the department. Its courses and its research sponsorship in the history of medicine and biology are available to undergraduates, medical students, graduate students, and postdoctoral fellows. Approximately twelve hundred rare books relevant to the development of the modern medical sciences provide a valuable adjunct to the teaching program.



# CONJOINT COURSES

Conjoint courses are offered cooperatively by departments in the School of Medicine. They are designed to integrate basic medical training with clinical work and, in some cases, to integrate basic medical training in two or more fields. For the list of courses, see the "Description of Courses" section of this catalog.

# FAMILY MEDICINE

C408 Health Sciences

### Faculty

T. J. Phillips, Chairman; Baker, Cole, Lincoln, Smith, Wiegert.

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, Chairman; Behrens, Chatrian, Cheng, Clausen, Clayson, Coyle, Detter, Gilliland, Hamernyik, Heywood, Kaplan, Kenny, Labbe, LeCrone, Lettich, McGonagle, Minckler, Plorde, Pollock, Raisys, Ray, Roby, Schiller, Schmer, Schoenknecht, Smith, Utauffer, Strandjord, Szabo, Wilkus.

The Department of Laboratory Medicine includes divisions of clinical chemistry, hematology, microbiology, coagulation, immunology, genetics, computer technology, and electroencephalography and neurophysiology. In addition to courses for medical students, the department offers a curriculum leading to the Bachelor of Science in Medical Technology degree.

### Bachelor of Science in Medical Technology Degree

The medical technology program is a four-year college program, supervised by the College of Arts and Sciences in the freshman and sophomore years (preprofessional, 90 quarter credits) and by the Department of Laboratory Medicine in the junior and senior years (professional, 105 quarter credits).

Admission Requirements: The professional curriculum consists of seven consecutive quarters of study that must be taken at the University of Washington School of Medicine. Prerequisite requirements may be satisfied at the University of Washington or at other accredited colleges and universities. Completion of 90 quarter credits, or achievement of junior standing, must be attained and must include the following preprofessional courses: one year of general chemistry, quantitative analysis, 10 quarter credits of organic chemistry; college algebra; and 15 quarter credits of biological science. Admission to the professional program is competitive and requires submission of an application to the Department of Laboratory Medicine by April 15 of the year the applicant plans to enroll. A grade-point average of 2.00, both cumulative and in required courses, is necessary for admission consideration.

Graduation Requirements: MICRO 441, 442, 443, 444; PATH 310; BIOC 405, 408; LAB M 320, 321, 322, 420, 421, 422, 423, 424, 425, 426, and 427. A 2.00 grade-point averge 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. Pètersdorf, Chairman; Aagaard, Adamson, Albers, Alvarez, Applebaum, Arend, Baylink, Beasley, Beaty, Belknap, Bierman, Blackmon, Blagg, Blair, Bornstein, Broviac, Browder, Bruce, Bruin, Brunzell, Bryant, Buckner, Burnell, Butler, Cabana, Camerman, Carlsen, Carlson, Chesnut, Christopher, H. Clark, R. Clark, Clift, Cobb, Cole, Cook, Counts, Crill, Cullen, Curtis, Cutler, Davidson, Dennis, Dillingham, Dodge, Dohner, Donahue, Ensinck, Espeland, Evans, Farrell, Fefer, Fialkow, Finch, Fleet, Forrey, Frimer, Fujimoto, Gartler, Gey, Giblett, Gilliland, Glomset, Glucksberg, Goldsworthy, Goodell, Goodner, Gotshall, Gould, Green, Griep, Hainer, Haining, Hall, Hamilton, Hammermeister, Harker, Harris, Hazzard, Hermodson, Hildebrandt, Hillman, Hlastala, Hogness, Holcenberg, Holmes, Hudson, Johnsen, Johnson, Irby, Kennedy, King, Kirby, Klebanoff, Koerker, Kraning, Kusumi, Langer, Larsen, Lavis, Lindner, Linscott, Lipscomb, Maloney, Mannik, McArthur, McDonough, Milner, Milutinovic, Mitchell, Morgan, Motulsky, Murray, Naum, Neiman, Nelp, Odland, Ogilvie, Omenn, Parrish, Paul, Paulsen, Petersdorf, Plorde, Pope, Porte. Preston, Pribble, Quadracci, Razevska, Richmond, Robertson, Rowell, Rubin, Rudd, Saunders, Sawyer, Schultz, Scribner, Shaw, Sherrard, Short, Silverblatt, Simkin, Simpson, Sinaly, Slichter, Smith, Sobolewski, Sparkman, Stahl, Stamatoyannopoulos, Stewart, Storb, Sullivan, Sumi, A. Swanson, P. Swanson, Tenckhoff, Tennican, Thomas, Thompson, Tsoi, Turck, Van-Arsdel, Van Citters, Volwiler, Wallace, Warren, Wenberg, Weinstein, Wergedal, Wilkus, Williams, Wills, Willson, Wood, Woods, Woodson, Zimmermann, Zinser.

Active teaching and research programs are carried on at the University and Veterans Administration hospitals and at Harborview Medical Center. Major affiliations also exist with the United States Public Health Service Hospital, Firland Hospital and, most recently, Providence Hospital. Medical students, interns, medical residents, and postdoctoral research fellows rotate through these various hospitals and participate in the learning experiences offered at each.

# MICROBIOLOGY

G305 Health Sciences

### Faculty

John C. Sherris, Chairman; Barnes, Chambers, Champoux, M. Chilton, Clagett, Clausen, Coyle, Cramer, Douglas, Evans, Falkow, Groman, Hakomori, I. Hellstrom, Kenny, Kiehn, Klebanoff, Lara, Laxson, Mannik, Memmer, Nester, Ordal, Parkhurst, Pearsall, Pollack, Pollock, Portman, Ray, Schoenknecht, Staley, U. Storb, Weiser, H. Whiteley. H. Douglas, graduate program adviser.

The Department of Microbiology is concerned with microbiology and immunology. As a branch of natural science dealing with microscopic organisms, including bacteria, viruses, fungi, protozoa, and algae, microbiology is concerned with the nature and properties of these organisms and their effects on man and the environment.

Immunology is a branch of natural science dealing with specific and nonspecific resistance to tissue injury by foreign or autochthonous substances. The mechanisms of resistance involve primarily the activities of leukocytes and antibodies, including those involved with the specific immune response.

# **Undergraduate Programs**

In addition to courses for health sciences professionals, the Department of Microbiology offers programs in microbiology that lead to a bachelor's degree in the College of Arts and Sciences (see "College of Arts and Sciences" section of this catalog).

### **Graduate Programs**

### Master of Science Degree

Admission Requirements: A minimum of a B grade average in the junior and senior years and approval by the faculty of microbiology. An undergraduate major in microbiology is not required. For the nonthesis medical microbiology option, one year of acceptable work experience in a medical or public health laboratory is required. Verbal and quantitative parts of the Graduate Record Examination must be taken by applicants. An advanced GRE in either biology or chemistry is useful but not required. Three letters of recommendation are required, as is a two-to-three-hundred-word statement of the applicant's educational and professional objectives.

Graduation Requirements: With Thesis—includes course work and preparation of a thesis based on laboratory research. Without Thesis—includes course work and an individually supervised laboratory project resulting in a report. There is no foreign-language requirement.

### **Doctor of Philosophy Degree**

Admission Requirements: Same as for Master of Science degree.

Graduation Requirements: Microbiology option—One course in three areas must be taken from among the general areas of virology, microbial physiology, advanced general microbiology, and immunology. Two courses must be taken from among the research methods courses offered in bacteriophage studies, enzymology, nucleic acid chemistry, immunochemistry, microbial genetics, and electron microscopy. Research. Laboratory teaching experience. General Examination, dissertation, and Final Examination. There is no for-



eign-language requirement. *Immunology option*—Same as microbiology option, except for specific additional course requirements.

### **Combined Doctor of Medicine–Doctor of Philosophy Degree**

This degree is offered in cooperation with the School of Medicine. Information about, and applications for, the Medical Scientist Training Program may be obtained by writing to: University of Washington, Office of the Dean, School of Medicine, C304 Health Sciences, SC-70, Seattle, Washington 98195.

# NEUROLOGICAL SURGERY

**RR744** University Hospital

### Faculty

Arthur A. Ward, Jr., Chairman; Calvin, Chatrian, DeVito, Doddrill, Fetz, Harris, Kelly, Lettich, Lockard, Loeser, Lund, Ojemann, Reitan, Troupin, Westrum.

The Department of Neurological Surgery is concerned with teaching and research in the entire spectrum of surgical diseases of the central and peripheral nervous system. Instruction in this area is provided for medical students and postgraduate physicians.

The department's medical student instruction includes participation in the neurosciences core course, as well as in elective clinical experiences, of which most are available only at the University Hospital. The department's neurosciences research seminar is available for those students interested in correlating research and clinical problems of the nervous system.

Selected medical students also may elect research experience within the Department of Neurological Surgery. The departmental research facilities are housed in the Medical Research Tower of the University Hospital, where investigations are under way in all types of neurophysiology, in behavioral research with primates, and in light and electron microscopic examination of the anatomy of the nervous system. Particular research interests include the basic aspects of animal models of such disease processes as epilepsy, including confirmation from human material. Opportunities are available for selected students from related basic science departments to participate in the multidisciplinary research activity in the department.

In addition to the undergraduate instruction, a fully certified residency program in neurological surgery is available for selected postgraduate physicians. The five-year program emphasizes preparation for a career in academic neurosurgery.

# OBSTETRICS AND GYNECOLOGY

**BB607** Health Sciences

### Faculty

Walter L. Herrmann, Chairman; Briggs, J. Conrad, S. Conrad, Der Yuen, Donahue, Donohue, Eschenbach, Figge, Gellert, Gibson, Heinrichs, Karp, Lein, Petra, Spadoni, Ueland, Tabei, 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, Chairman; Bunt, Chandler, Futterman, Hendrickson, Kalina, Kramar, Lund, McLean.

The Department of Ophthalmology is responsible for the instructional and research programs in diseases of the eye and related structures.

# ORTHOPAEDICS

**BB1043 University Hospital** 

### Faculty

D. Kay Clawson, Chairman; Baker, Bath, Chaplin, Dimond, Fry, Garrick, Greenlee, Hansen, Knott, Kirkpatrick, LaVigne, Lippert, Sandler.

In addition to providing instruction for medical students, the Department of Orthopaedics participates in the teaching program of students in the School of Nursing, the School of Dentistry, and the Department of Rehabilitation Medicine. A fully approved residency with opportunities to carry out fundamental research is offered. Residents may work toward the Master of Science degree by meeting the requirements of the Graduate School and the academic unit offering the degree program.

# OTOLARYNGOLOGY

**BB1165 University Hospital** 

### Faculty

James Donaldson, Chairman; Axelsson, Barga, Kimm, Lewis, McPherson, Miller, Morrison, Rees, C. J. Smith, Snyder, Strothers, Sutton, M. West. 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, Chairman; Alvord, Barker, Beckwith, Giddens, Hall, Hellström, Hoehn, Huang, Lagunoff, Lee, Leech, Lerner, Lowe, Martin, Moss, Mottet, Norris, Quadracci, Page, Reichenbach, Ross, Rothschild, Schweid, Shaw, Smuckler, Sreebny, Stauffer, Striker, Sumi, Vracko, Wiegenstein, Wolf. Edward A. Smuckler, 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 main interests of the department are diseases of vertebrates, especially of man and other mammals.

The principal aim of the pathologist is to understand disease manifestations and processes in whatever terms are required. Therefore, the techniques of the pathologist range from those of the physicist and physical chemist through those of the physiologist to the realm of the epidemiologist. Present emphasis in the department is on cellular and molecular pathology, analysis of disease by light and electron microscopy, histochemistry and cytochemistry, analytical biochemistry, cell and organ culture, and immunology.

Courses are offered for medical students, dental students, students of medical technology, and other allied health sciences professions. A program leading to a Doctor of Philosophy degree in the field of experimental pathology is offered for both predoctoral students and those with degrees in medicine, dentistry, or veterinary medicine.

Central teaching and research facilities are located in the Health Sciences Center and University Hospital. Closely associated are the personnel and facilities of Harborview Medical Center, Veterans Administration Hospital, United States Public Health Service Hospital, Children's Orthopedic Hospital and Medical Center, Swedish Hospital, and Virginia Mason Clinic.

Research programs in the department include studies of the basic pathological process involved in such diseases as arteriosclerosis, cancer, and inflammation (including allergic diseases), and of the injurious effects of various drugs, toxins, foods, and other things derived from the environment. Diseases of certain systems, including such organs as the brain, heart, blood vessels, kidneys, lungs, liver, and skin, are studied with appropriate specialists in these areas. The approach to the study of these basic disease entities and specific systemic diseases utilizes the concepts and techniques of modern cell biology. The combination of modern morphologic techniques with chemical and functional studies is emphasized throughout.

### **Graduate Programs**

### Master of Science and Doctor of Philosophy-Degrees

Programs in the field of experimental pathology that lead to the Master of Science or Doctor of Philosophy degrees are offered through the Graduate School. Graduates of the program are qualified for research and academic appointments in medical, dental, or veterinary schools, as well as in experimental pathology in government laboratories and private industry.

#### **Postdoctoral Programs**

Postdoctoral traineeships in experimental pathology include specialized programs in renal pathology, electron microscopy, immunopathology, tumor biology, genetic pathology, connective tissue and vascular disorders, inflammation, and developmental pathology and neuropathology.

### **Residency Training Program**

The department supervises an internship and residency training program in anatomic pathology and, jointly with the Department of Laboratory Medicine, in clinical pathology for qualified medical doctors. Persons who complete the residency program are eligible for certification by the American Board of Pathology. N. Karle Mottet is program director.

# PEDIATRICS

**RR314 University Hospital** 

#### Faculty

Beverly Morgan, Chairman; Axelrod, Beckwith, Bergman, Berlin, Bernstein, Campbell, Carlson, Chen, Counts, Cuene, Davis, Deisher, Doan, Emanuel, Graham, Guntheroth, Hall, Haring, Hayden, Hill, Hodson,

MEDICINE



Hollister, Holm, Johnsen, Johnson, Kawabori, Kelley, Labbe, Lamson, Lemire, Lopez, Mackler, Mattison, Millis, Morgan, Ochs, Owens, Pious, Raskin, Ray, Regimbal, Robertson, Rothenberg, Ruvalcaba, Schaller, Scott, Sells, Shepard, Shurtleff, D. Smith, E. Smith, N. Smith, Standaert, Sulzbacher, Tippit, Wedgwood, Wennberg, Wenner, Wiltz, Woodrum, Wright.

Pediatrics involves the study of the physical and behavioral development of man, in health and disease, from conception to maturity. Alterations of the developmental process from genetic and environmental causes, the changing response to stress during maturation, and the effect of nutritional, physical, and emotional stress on development are the manifestations of child health of primary pediatric concern. The holistic approach to the ontogenetic and ecologic changes is intrinsic to understanding the changes, both of disease and function, occurring throughout the life span of man.

Instruction is provided through conjoint courses, lectures, conferences, clerkships, and electives.

# PHARMACOLOGY

F421 Health Sciences

### Faculty

Akira Horita, Acting Chairman; Aagaard, Amory, Camerman, Collins, Davis, deJong, Dille, Dyer, Gough, Halpern, Holcenberg, Juchau, Loomis, Namkung, Siegel, Thiersch, Vincenzi, Watson, Wong.

Pharmacology is the science that deals with the nature of the selective interactions between drugs and the biological system, and with the application of these drugs to the treatment of disease.

### **Graduate Programs**

### Master of Science and Doctor of Philosophy Degrees

Admission Requirement: A bachelor's degree with a major in any of the sciences, such as biochemistry, chemistry, pharmacy, physics, physiology, psychology, or zoology.

Graduation Requirements: Master of Science degree— PHCOL 441, 442, 443, 444, 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 441, 442, 443, 444, 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, Chairman; Almers, Biedenbach, Brengelmann, Brown, Chang, Conrad, Crill, Donaldson, Feigl, Fetz, Fuchs, Gale, Gordon, Harris, Hildebrandt, Hille, Hornbein, Ito, Kehl, Kennedy, Kimm, Koerker, Landau, Luschei, Martin, McGuire, Miller, Rowell, Ruch, Scher, Schwindt, Shaw, Simpson, Smith, Stahl, Stevens, Stirling, Stromberg, 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 bachelor's degree in zoology, psychology, chemistry, engineering, or physics, or with an M.D. degree, is acceptable as an applicant for an M.S. or Ph.D. degree.

Graduate students in physiology and biophysics with a medical degree have their curricula adjusted in accordance with their training.

# Programs of Study

In the organization of the graduate program in physiology and biophysics, several specializations within the broad field of physiology are recognized, and the requirements and curricula are different for each, although there is considerable overlapping. The areas of specialization cover the functions of cell membranes, the nervous system, the renal and gastrointestinal systems, muscle, circulation, respiration, and the endocrines. For students who desire a program equally divided between physiology and psychology, an interdisciplinary Ph.D. degree program in these subjects is administered by the Physiology Psychology Group of the Graduate School. The basic graduate courses include P BIO 409, 410, 411, 412, 413, 414, 415 (see "Interdisciplinary Graduate Degree Programs" section of this catalog).

# PSYCHIATRY AND BEHAVIORAL SCIENCES

**BB1644 Health Sciences** 

### Faculty

C. Eisdorfer, Chairman; Armstrong, Axelrod, Backus, Bakker, Becker, Berlin, Bowden, Campbell, Carlin, Carr, Chapman, Chiles, Cox, Doerr, Dudley, DuHamel, Dunn, S. Eisdorfer, Erickson, Feldman-Summers, Fellner, Freeman, Friedel, Furedy, Gerber, Hague, Hampson, Holmes, Horita, James, Johnson, D. Martin, J. Martin, Masuda, Maxim, Nash, O'Leary, Paige, Petrich, Preston, D. Raskin, J. Raskin, Raskind, Ripley, Rothenberg, Sata, Shapiro, Stotsky, Strother, Taylor, Townes, Wilkie, Wilson, Womack.

The coordinated research, teaching, and clinical programs of the Department of Psychiatry and Behavioral Sciences are designed to provide students with a basic knowledge of (1) the broad range of conditions that cause and sustain behavior disorders; (2) the factors that influence the effectiveness of the professional as a behavior change agent; and (3) the techniques and clinical skills required for successful behavioral intervention.

Emphasis is on a multidisciplinary approach to research and treatment in three program areas: (1) Ecological—concerned with the impact upon behavior of sociocultural factors, institutions and systems, and the epidemiology of behavior disorders; Interpersonal concerned with social relations and perception, group processes, and other social psychological phenomena; and Intraindividual—concerned with the biological bases of behavior, learning, cognition, and the developmental and aging processes.

Instruction in psychiatry and behavioral science is given during each of the four years of the medical school curriculum and is coordinated and integrated with the various disciplines of medicine. Thus, from the beginning of his career, the student is stimulated to think in terms of understanding the totally functioning human being.

# RADIOLOGY

SS230 University Hospital

Faculty

Melvin M. Figley, Chairman, Allan, Allen, Anderson,

Beckly, Berry, Bichsel, Chesnut, Chikos, Christensen, Figley, Gerdes, Graham, Harley, Jackson, Loop, Nelp, Northrop, Parker, Phillips, Ricketts, 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, Chairman; Anderson, Berni, Bollinger, Caldwell, Chandler, Clowers, Delateur, Donovan, Dralle, Fordyce, Fowler, Guy, Halar, Harlock,



Hertling, Hongladarom, Horning, Kirby, Kraft, Lin, Lucci, Mayers, McGee, McMillan, Nicholson, Sand, Simons, Stolov, Stonebridge, Taylor, 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 for use of physical therapy, occupational therapy, and other health professions; and advanced investigation of special problems encountered in the field. In addition, the department conducts a residency training program for the specialty of physical medicine and rehabilitation.

The department offers curricula leading to the following degrees: Bachelor of Science in Occupational Therapy, Master of Occupational Therapy, Bachelor of Science in Physical Therapy, Bachelor of Science in the field of prosthetics and orthotics, and a Master of Science for residents in physical medicine and rehabilitation who wish to enter the academic field.

# **Occupational Therapy**

### Head

Jennie A. Lucci BB863 University Hospital

Occupational therapy is one of the vital health care disciplines that provides service through planned activities, such as creative and manual arts; self-care and homemaking skills; and perceptual-motor, prevocational, or recreational activities to those individuals whose abilities are impaired by developmental deficits, aging, poverty, cultural differences, physical injury, illness, or psychologic and social disability. Its direction is to evaluate abilities, to re-educate, to treat, to prevent, or to restore the disabilities, and to assist in the psychological and social adjustment.

The program in occupational therapy is approved by the Council on Medical Education of the American Medical Association and the American Occupational Therapy Association. Graduates are eligible to become registered occupational therapists by passing the American Occupational Therapy certification examination.

# **Bachelor of Science in Occupational Therapy Degree**

Admission Requirements: Students are admitted to the professional program at the junior level. Preprofessional requirements prior to admission include completion of the proficiency and distribution requirements, with a minimum of 20 credits each in the humanities, natural sciences, and social sciences, and EDC&I 312;

B STR 301; PHYS 114, 117; PSYCH 100 or 101; PSYCH 306; SOC 110; ZOOL 118 or 208; REHAB 290 on a letter-grade basis with a minimum cumulative grade-point average of 2.50, as well as a cumulative grade-point average of 2.50 in all academic work. Transfer students should consult the Division of Occupational Therapy to determine eligibility for the professional program. All interested applicants should obtain a copy of the program requirements and selection process from the Division of Occupational Therapy.

*Graduation Requirements:* REHAB 320, 321, 332, 380, 414, 442, 444, 445, 446, 447, 468, 469 (as required), 473, 474, 477, 481, 482, 483, 484, 499; EDC&I 313; H EC 329; PSYC 451, 452; 8 credits from PSYC 267, 457, 458, 553, 565; PSYCH 305, 345; SOC 352, 347 or UCONJ 490; and REHAB 494, (six months of field experience) with a minimum cumulative grade-point average of 2.50 in major courses.

## **Physical Therapy**

Head Jo Ann McMillan BB867 University Hospital

Physical therapy is a health care profession whose practitioners work in hospitals, clinics, nursing homes, and private practice. Physical therapy practitioners receive patients on the referral of a licensed physician or dentist and maintain contact with them regarding the care of the patient. Patients treated by physical therapists include those disabled by illness or accident or born with a handicap.

The treatments given by physical therapists include exercises for increasing strength, endurance, coordination, and range of motion; stimuli to facilitate motor activity and learning; instruction in activities of daily living and the use of assistive devices; and the application of physical agents, such as heat and cold, sound, and water, to relieve pain or to alter physiological status. In addition, physical therapists try to motivate and instruct the patient, the patient's family, and others who might help during the treatment and convalescent period.

Several of patterns of education lead to basic professional certification in physical therapy. The University of Washington offers only the baccalaureate degree program for that objective. The degree awarded by the School of Medicine is approved by the American Medical Association in collaboration with the American Physical Therapy Association.

Admission Requirements: Students are admitted to the professional program at the junior level. Preprofes-

sional requirements prior to admission include completion of the College of Arts and Sciences proficiency and distribution requirements with a minimum of 20 credits each in the humanities, natural sciences, and social sciences; and completion of a minimum of 22 credits in two of the three major areas of the following prerequisite course work:

Physical Sciences: CHEM 101, General Chemistry (5 credits); CHEM 102, General and Organic Chemistry (5) One year of general chemistry may be substituted for the above courses in chemistry. PHYS 114, 115, 117, 118, General Physics (10).

Biological Sciences: B STR 301, General Anatomy (4 credits); ZOOL 118, Survey of Physiology (5) or ZOOL 208, Elementary Human Physiology (5); MICRO 301, General Microbiology (5).

Social Sciences: PSYCH 100, General Psychology (5 credits); one additional psychology or psychiatry course (5).

The preceding courses must be taken on a letter-grade basis with a minimum cumulative grade-point average of 2.50. Applicants also must have achieved a cumulative grade-point average of 2.50 in all academic work in order to be considered for admission. Transfer students should consult the Division of Physical Therapy office to determine eligibility for the professional program. Detailed program requirements and selection process information may be obtained from the Division of Physical Therapy.

*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, 444–445, 451, 452, 459, 460, 461, 463, 466, 467, 470–471–472, 475, 476, 489, 490, 491, 495; 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 on all required courses for satisfactory standing and for graduation from the curriculum. At the end of each academic year, the Advisory and Evaluation Committee for Physical Therapy reviews the accomplishment of the student during the year and determines his or her fitness for promotion. This determination is based upon the committee's judgment of the likelihood of the student's satisfactory performance as a professional physical therapist. **Prosthetics and Orthotics** Undergraduate Program Adviser Bernard C. Simons BB12 University Hospital

The prosthetist-orthotist is part of a professional medical team devoted to the evaluation and treatment of the physically handicapped. He or she is responsible for the designing and fabricating of prosthetic and orthotic devices (artificial limbs and braces) and for helping handicapped patients of all ages to enjoy more functional and independent lives.

#### **Bachelor of Science Degree**

Admission Requirements: Students are admitted to this curriculum at the junior level and, among other qualifications, usually must have completed the specific requirements or their equivalent with a cumulative grade-point average of at least 2.50. Exceptional cases are considered when applications are supported by adequate evidence of qualifications. Detailed admission requirements and description of the program may be obtained from the prosthetic-orthotic curriculum office.

*Graduation Requirements:* REHAB 320-321, 340, 341, 343, 408, 414, 420, 421, 422, 423, 425, 427-428, 442, 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 Laboratory Advisory Committee.

Proficiency requirements for the program are completion of the freshman English requirements, and MATH 101 or equivalent by test score, and trigonometry in high school or college.

A listing of required courses appears in the professional bulletin of the School of Medicine.

Students who are interested in pursuing this program may contact the Director of Prosthetics and Orthotics, BB12 University Hospital.

#### Graduate Programs

Graduate Program Adviser Justus F. Lehmann

The graduate programs in rehabilitation medicine lead to the degrees of Master of Science or Master of Occupational Therapy. An applicant for admission to the Master of Science degree program must be enrolled, or have completed residency training, in the specialty of



physical medicine and rehabilitation. An applicant for admission to the Master of Occupational Therapy degree program must be a registered occupational therapist or have a college degree in a related field. One year of working experience is desirable. In addition, all applicants must meet the requirements of the Graduate School.

A program leading to the Master of Physical Therapy degree has been approved and will be offered, beginning Autumn Quarter 1975. This program will be for professional physical therapists seeking a second-level degree.

#### **Master of Science Degree**

It is anticipated that graduate students working toward the Master of Science degree will take some of the course work during the three-year residency and will devote an additional one to two years to the master's program. Opportunity is given to students who have already completed their residencies to combine the course work and research in a two-to-three-year program.

#### Master of Occupational Therapy Degree

This graduate program is designed to prepare the registered occupational therapist as an academic or clinical educator, administrator-supervisor, or researcher in the field of occupational therapy. Departmental requirements include the established core courses and an approved thesis. Remaining credits may be earned through appropriate elective courses directed to the student's area of interest. Opportunities for supervised teaching, as well as administrative practice, are incorporated in course work. Based on an applicant's needs and prior preparation, the program can be planned to cover a span of one to two academic years.

Admission Requirements: One-year program, open to the registered occupational therapist with a bachelor's degree from an accredited institution. Graduate Record Examination score; one year of professional work experience desirable.

Two-year program approved by the American Medical Association and the American Occupational Therapy Association for those with bachelor's degrees in a related field from an accredited institution. Graduate Record Examination scores required.

Graduation Requirements: One-year program, minimum of 36 credits, of which 18 must be in courses at the 500 level or above, including established core courses and electives in area of special interest. Completion of an approved thesis.

Two-year program, minimum of 75 quarter credits, with approximately 35 credits in courses at the 500 level or above, six months of field work, and completion of an approved thesis.

Detailed admission requirements and descriptions of the available programs may be obtained from the Division of Occupational Therapy.

# SURGERY

### BB487 University Hospital Faculty

G. Thomas Shires, Chairman; Brockenbrough, Canizaro, Cantrell, Carrico, DeShazo, DeVito, Dillard, Hessel, Manhas, Marchioro, Merendino, Moe, Mohri, Radke, Sevin, Stevenson, Strandness, Sumner, White, Winterscheid, Yates.

In the Department of Surgery, instruction is carried on during all four years of the medical student's training and is integrated with that of the other departments in the School of Medicine.

The undergraduate instruction in surgery provides the student with a basic background of surgical principles and surgical diagnosis and a knowledge of surgical problems. In addition to the basic undergraduate instruction, a fully certified surgical residency program is available in general and thoracic surgery.

# UROLOGY

**BB1115 Health Sciences** 

### Faculty

Julian Ansell, Chairman; Barnes, Chapman, Correa, Keene, Kiviat, Miller, Monda, Tremann.

Urology is the surgical discipline concerned with diseases of the male genitourinary organs and the female urinary tract. Training for medical students starts in the second year and continues through the third and fourth years.

Training is also provided for interns, nurses, and physical medicine technologists and allied specialists.

An approved urology residency program is available.



# NURSING

Acting Dean Dorothy M. Crowley

Associate Deans Dorothy Crowley Doris Geitgey

#### Assistant Deans

Elizabeth Byerly Florence Gray

#### Faculty

Aavedal, Abbs, Aeschliman, Alexander, Andrews, Atkins, Auld, Baker, Banigan, Barnard, Batey, Benoliel, Blainey, Bolin, Boozer, Brandt, Breckenridge, Brengelmann, Cowan, Briscoe, Bruno, Bumbalo, Bush, Byerly, C. Campbell, F. Campbell, Carnevali, Caulfield, Chrisman, Cobb, Collar, Cook, Coombe, Craven, Crowley, Denton, Disbrow, Donaldson, Draye, Eggert, Emerson, Erickson, Estes, Fancher, Farrand, Fine, Fisher, FitzGerald, Geitgey, Giblin, Graves, Gray, Guenther, Gurel, Haferkorn, Hall, Harlow, Hay, Haynes, Heinemann, Hellstrom, Hicks, Hitchens, Hoffman, Inglis, Innes, Jones, Kelley, Kellogg, Krumme, Larson, Leitch, Lenszion, Leonard, Little, Livingston, Lobenstein, Luckmann, Mansfield, Mac-Elveen, McIntyre, Mitchell, Naas, Nakagawa, Newcomer, Newman, Niland, O'Neil, Osborne, Patrick, Pesznecker, Peterson, Pittman, Pitts, Poulsen, Raynor, Reese, Rose, Rugg, Saxon, Sharp, Smith, Snyder, Stackman, Standeven, Sullivan, Tamerius, Vandeman, Waggoner, Walike, Ware, Werner, White, Williams, Winters, Wolf, Worthy.

Nursing has a unique societal role in assisting individuals, families, and community groups to cope with health problems of a physical, emotional, cultural, or social nature. Individuals and groups are in continuous interaction with a changing sociophysical environment as they strive to meet their health needs. A variety of conditions and pressures exert an impact upon the individuals, families, and community groups in maintaining a healthy state of well-being. Moreover, individuals and social units vary in their ability to deal effectively with such life stresses and environmental conditions. The practice of nursing focuses upon ways to help individuals and groups to promote and maintain an optimal health state and endeavors to provide remedial care and treatment to persons from many different social, cultural, and economic groups. The art and science of providing comprehensive nursing care services is the focus of nursing and of our educational programs.

The University of Washington School of Nursing proposes to prepare nurses to give effective, safe, and competent nursing care. With continued experience and ongoing professional learning opportunities, these nurses will become increasingly proficient in providing general or specialized nursing services. The graduates of our nursing programs are expected to collaborate with a variety of health disciplines in planning, implementing, and evaluating health care services, but these graduates are specifically responsible for the quality of nursing care given to individuals and groups. Nurses, as practitioners, are expected to be creative thinkers and initiators of change and to be able to make independent decisions regarding nursing care, all based on a sound foundation of scientific and humanistic principles and research related to health care. In order to maintain and coordinate quality care, the professional nurse also assumes the responsibility for directing nursing care of nursing assistants who have less preparation.

The first nursing course given at the University of Washington was offered in June, 1918. The School of Nursing became an autonomous unit in 1945 under the leadership of Elizabeth Sterling Soule, R.N., M.A., D.S., the first Dean of the school (1945-50). Building on the groundwork laid by Dean Soule were Dean Lillian Patterson, R.N., M.A., (1950-55), and Dean Mary Tschudin, R.N., Ph.D., (1955-69). In 1969, under the leadership of Dean Madeleine Leininger, R.N., Ph.D., the school began to develop new innovations in teaching, research, and community service. Recognized as one of the outstanding schools of nursing in the country, the school has prepared distinguished leaders, teachers, administrators, researchers, and practitioners who have been active in regional, national, and international nursing endeavors.

The present philosophy of the School of Nursing was adopted by the faculty in November, 1970. This philosophy supports the undergraduate and graduate programs within the framework of the overall philosophy of the University of Washington. The faculty assumes the responsibilities for the quality of the educational programs offered and for the promotion of effective nursing for the public through teaching, research, and service. Successful completion of the undergraduate program with the appropriate level of academic achievement enables the student to continue directly into graduate study. In response to the changing needs within our society and in acknowledgment of the growing involvement of citizens concerned with their health care and the quality of their total environment, the faculty of the School of Nursing accepts the following statements as a reflection of its beliefs:

We believe that each human being is endowed with individual qualities but holds, in common with other humans, the basic need for dignity, respect, and recognition of his individual worth and uniqueness. The individual develops as a whole being and interacts with his environment. He is affected by and affects his environment through dynamic reciprocal relationships that involve his health and his ability to develop his potential. Man is concerned with the quality of his life, and each person has a right to participate in the decisions affecting his well-being.

Man's ability to utilize his full potential is basic to health. Health is influenced by the changes that affect man and his environment, and vice versa. All persons have a right to competent health care services. The events of the present presage even more rapid change in the years ahead. Persons and social units vary in their ability to deal effectively with change and its results. It is essential the disciplines within the health care systems understand the complexity and effects of change and the processes involved. In addition, health care disciplines have the responsibility for, and the ability to collaborate with, the recipients of their services.

Nursing is a health care discipline and exists to promote health and provide care. Nursing has a professional responsibility to expand its body of knowledge through research. The profession should initiate and respond to changes pertinent to the health of man and his environment. Nursing is a caring process that involves working with others and through others. The process responds to the basic human need for compassion and dignity. Caring encompasses the provision of those elements necessary for promoting, conserving, or restoring health, or enabling a dignified death. It includes those activities that persons would perform unaided if they had the strength, will, knowledge, or courage. Implicit in caring is respect for the individual that is essential to the realization of his maximal potential for health. Caring is the acceptance of responsibility for another person or persons in situations where protection or assistance is needed. The caring process is demonstrated through nursing actions based on theories and knowledge from nursing, the physical and behavioral sciences, and the humanities. Nursing actions should be scientific, rational, deliberate, and humanistic.

Preparation of professional nurses capable of promoting and meeting present and future challenges demands a flexible curriculum responsive to change. Baccalaureate education in nursing assists an individual to become an informed, educated, and compassionate person with a foundation for competent nursing practice, professional leadership, and effective participation in community affairs: Basic to learning the above is the individual's self-awareness and personal involvement in the learning process. Baccalaureate education serves as a stimulus for the student to accept responsibility for development of his maximal potential and to continue in a life-long educational pursuit if desired. Students enter the program with diverse and varying educational and personal experiences. Persons desiring baccalaureate education in nursing are allowed to enter at the point complementary to each individual's background. Throughout the program, students are encouraged to assume increasing self-direction and independence. Core content germane to professional nursing practice is provided for all students enrolled in baccalaureate education. Increased complexity of nursing knowledge and practice precludes intensive preparation in all major areas of nursing practice at the undergraduate level. Exposure to specialization is offered through opportunities to pursue selected nursing and related interests.

The baccalaureate graduate is prepared to make informed judgments and to do critical thinking. The graduate is able to assume the initiative and responsibility for making nursing decisions and formulating new approaches as necessitated by varying circumstances and technological advances. Essential to the development of the above processes is a curriculum based on knowledge and scientific findings from nursing, the physical and behavioral sciences, and the humanities. Opportunities for learning include many types of experiences and environments. Students and faculty share in the search for excellence in nursing through the manipulation, synthesis, and testing of theories and abstract ideas and their relationships.

In February, 1971, addition of five new organizational units to the School of Nursing was approved by the Board of Regents. The five new departments were established primarily for the advancement and transmission of knowledge in the field of nursing.

Undergraduate students do not affiliate directly with a specific department, because the program of study is designed to draw upon knowledge and skills from all the departments. At the graduate level, however, the student selects a departmental affiliation to gain a depth of knowledge and skill in a particular field of study in nursing.

# COMPARATIVE NURSING CARE SYSTEMS

#### Chairperson

Jeanne Benoliel T518 Health Sciences Teaching

Courses of study available through this department are concerned with two areas of knowledge.

Cross-cultural Nursing: This program is designed to prepare professional nurses for roles in cross-cultural and international systems of health care delivery and to encourage advancement and transmission of nursing knowledge and practices within these systems. The program seeks to prepare professional nurses to function effectively among people of different cultural and subcultural backgrounds in Western and non-Western societies. Emphasis is on the reciprocal influences of health care systems and the dynamics of cultural and societal change processes; the similarities and differences in value orientations; the sociocultural perceptions and cognitions of illness and health; the biocultural processes in health and disease; and the cross-cultural and subcultural patterns of nursing care.

Health Care Systems: This program focuses on structural-functional and interactional elements of these systems. Levels of analysis may range from the smallest segments within the system to the interaction of the health care system with other societal systems. Study in nursing administration is available under this program.

# FAMILY AND COMMUNITY NURSING

Chairperson

Marguerite Cobb T517 Health Sciences Teaching

Programs of study offered through this department are directed toward the preparation of professional nurses with a major interest in family and community nursing. Courses of study available through this department have three major components: (1) a clinician component that focuses on the therapeutic process in relation to family health assessment and counseling and advanced community health nursing; (2) a leadership component that focuses on principles and practices of group leadership processes, teaching, and administration; and (3) a research component that focuses on independent study and the use of research findings in relation to family and community health.

# MATERNAL AND CHILD

Chairperson Patricia Rose T410 Health Sciences Teaching

Programs in maternal-child nursing focus upon the normal physiological and psychological stresses inherent in the individual's life from birth through the



child-bearing and -rearing years. The influence of the intergenerational biological, genetic, social, and emotional adaptations of children and parents are of major interest. Stresses related to growth and development, preparation for family life, role adaptation, pregnancy, childbirth, child-rearing, and middle age provide areas for teaching and research.

# PHYSIOLOGICAL NURSING

Chairperson Maxine Patrick T611 Health Sciences Teaching

Programs of study offered in this department are directed toward the preparation of professional nurses with a major interest in the care of adults with problems of a health-illness nature in which disturbances of a physiological nature are a major element for the need for care. Courses offered in the department are directed to the transmission and expansion of a body of substantive knowledge upon which clinical practice is based. Courses are offered in both specialized and general areas of physiological nursing.

# PSYCHOSOCIAL NURSING

Chairperson

Oliver Osborne T407 Health Sciences Teaching

Programs in psychosocial nursing offer several pathways of study pertinent to individual career goals. The pathways include individual treatment, group treatment, family treatment, child psychiatric nursing, and community mental health. These pathways are built upon a required theoretical basis of three courses. Students are expected to select at least two pathways and to take the seminar and practicum in each. Research, primary prevention, and community involvement are general themes that pervade all offerings of the department. Completion of the program usually requires at least five quarters.

### **Facilities and Services**

The School of Nursing is part of the Health Sciences Center, which comprises the schools of Dentistry, Medicine, Nursing, and Pharmacy. In November, 1972, the School of Nursing moved into a new building with facilities such as study carrells wired for the use of multimedia instruction, behavioral science laboratories with one-way mirrors for observation and videotaping of interviews with individuals and interactions in groups, and an audiovisual production studio that provides opportunities for students to engage in innovative and creative modes of teaching and learning.

Supplementing the main campus library, the Health Sciences Library in the new building incorporates the latest developments in planning and facilities. Some areas of the library remain open at night.

### **Associated Students of Nursing**

All students registered in the undergraduate program of the School of Nursing are eligible for membership in the Associated Students of Nursing organization. By belonging to ASN, students are eligible to belong to the State of Washington Association of Nursing Students (SWANS), whose membership comprises students from all the schools of nursing in the state. As a member of SWANS, a student is automatically a member of the National Student Nurse Association. Registered nurses who are students join the Washington State Nurses Association.

### **Continuing Nursing Education**

The University of Washington School of Nursing, to meet increasing demands and challenges for improved health care, has given new emphasis to the development of a viable Continuing Nursing Education program for registered nurses who are not enrolled as students at the University. Through grant support from the United States Public Health Service, Division of Nursing, the program provides supportive service to the School of Nursing faculty, the University, and the community, to help nurses continue their education and gain new knowledge and skills.

### Undergraduate Programs

Assistant Dean, Director of Undergraduate Programs Florence Gray

**T301 Health Sciences Teaching** 

Bachelor of Science in Nursing Degree

The curriculum leading to the Bachelor of Science in Nursing degree is designed for two types of students: (1) with no previous preparation in nursing, or (2) a graduate of a hospital or community college school of nursing, who is referred to as registered nurse student.

#### Objectives

Upon completion of the undergraduate program, the School of Nursing faculty believes the student will be able to make an outstanding contribution to professional nursing. The student—

(1) Assesses with individuals and groups their health-illness status and context in order to determine

nursing care implications. (2) Collaborates with others to synthesize plans to improve health care. (3) Formulates a plan of nursing care that contributes to the total plan of health care. (4) Implements plans for health and nursing care within broad health care plans or systems. (5) Implements teaching to improve nursing and health care. (6) Evaluates the effectiveness of nursing care and health plans and systems. (7) Develops 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 being responsible for own learning. (15) Is characterized by using social actions with responsibility to bring about changes in the interest of promoting health. (16) Is characterized by the ability to use dynamic technological advances to improve nursing and health care.

### **Undergraduate Admission**

The School of Nursing curriculum offers the undergraduate student two major entry points into the professional program: Summer Quarter or Winter Quarter of the sophomore year.

Some students with additional backgrounds may, after testing, be allowed to enter more advanced levels. Admission into the professional part of the program is restricted and selective and may occur either by progression of freshman students enrolled in this university, or by transfer of students from other institutions.

In the filling of the enrollment quota for the professional part of the nursing program, preference will be given those applicants, in the judgment of the school, best qualified to undertake the program. Equal consideration will be given applicants already enrolled in the school or seeking transfer to it from elsewhere on the University campus or from another institution. Prospective transfer students must write to the School of Nursing undergraduate advising office approximately three quarters before they wish to enter the professional part of the nursing program. Applications from minority students and male students will be given special consideration. A total of 45 credits must be completed before the professional part of the program, with registration in CONJ 317–318, Introductory Anatomy and Physiology, is undertaken. Selection of students for the professional part of the program will be based on the following criteria: applicant's admissibility to the University; applicant's scholastic standing in high school and college; completion of 25 credits, including at least one required chemistry course; additional specifics for selection and evaluation that are available from the undergraduate advising office; indication of plans to complete 45 credits prior to enrollment in the professional component; submission to the School of Nursing by specified deadlines of all required information.

The 45 credits should include: college-level science proficiency shown by: CHEM 101 and 102 (10 credits). Humanities and behavioral science proficiencies shown by: freshman English (5); PSYCH 100 or 101 (5); and electives (2–7). College-level analytic proficiency shown by: MATH 105 or 106 (3–5).

### **Admission With Advanced Standing**

Students from other schools of nursing who wish to transfer into the advanced nursing courses at the University of Washington should be aware that limited clinical facilities and limited educational resources restrict the number of transfer students who may be accommodated. Students contemplating transfer to this school must contact the undergraduate advising office of the School of Nursing prior to the quarter they wish to enter. The undergraduate advising office has the responsibility of deciding how the student's previous nursing program coincides with the current curriculum requirements at the University of Washington. Students are placed on a first-come-first-served basis to the extent that space is available.

### **Fifth-Year Students**

Those students who already possess a baccalaureate degree and who wish to pursue a second baccalaureate degree in nursing will be accommodated to the extent that there is room for them. The application procedure is the same as that for admission to the professional part of the program.

Students who hold a baccalaureate degree in nursing with a deficiency in basic community-health nursing or psychosocial nursing may be admitted with fifth-year status as space becomes available. A student admitted with fifth-year status is not in Graduate School.

### **Registered Nurse Students**

The School of Nursing makes available to the registered nurse student the opportunity to complete requirements for the Bachelor of Science in Nursing degree. The student follows the standard School of Nursing admission procedure.

# **Specific School Requirements**

NURS 281, 263, 297, 301, 303, 300, 321, 322, 361, 323, 324, 325, 326, 400, 405, 406, 401, 423; CHEM 101, 102; PSYCH 100 or 101; ANTH 202 or SOC 110; MATH 105 or 106; CONJ 317–318; MICRO 301, 302; a course in pharmacy; SOC 223 or EDPSY 490 or PC BS 472; a course in nutrition; freshman English, 5 credits; PE 205; electives, 31–35 credits. A total of 194 credits is required for the Bachelor of Science in Nursing degree.

# **Advanced Credit Examinations**

Because the faculty of the School of Nursing believes that students bring to the program a variety of competencies and knowledge, advanced credit examinations are planned for all nursing courses. These examinations, however, will not be available until courses have been taught at least once in the new curriculum. All credit obtained by advanced credit examination is considered by University policy to be extension credit. A total of 90 credits may be earned by advanced credit examination.

### **Other Programs**

### Supplementary Community Health Nursing Program

Supplementary study is available to prepare for community health nursing the registered nurse holding a baccalaureate degree in nursing or higher degree. The program extends over two quarters and includes a minimum of 20 credits in required and elective courses. At least half of the course credits must be in nursing. The program must include community health nursing field practice. Satisfactory completion of the program will be noted on the student's transcript.

## **School Nurse Certification**

Supplementary study to prepare for school nurse certification the registered nurse holding a baccalaureate degree in nursing that includes an accredited component in community health nursing is jointly planned and administered by the College of Education and the School of Nursing. The College of Education and the School of Nursing review credentials and make recommendations for either provisional or standard certification, the College of Education on completion of the professional education requirements and the School of Nursing on completion of the nursing requirements.

### Affiliate Program

Selected arrangements with schools or individuals for community health nursing and upper-division psychoso-

cial nursing theory and field courses may be worked out. Affiliating students enroll in the University and the School of Nursing for the quarter during which they are taking the designated courses. They are required to meet the admission requirements prescribed by the University and must pay the usual tuition and fees. University credit is granted upon successful completion of the courses.

## Health Care

Any student who enrolls in the School of Nursing is required to have had a recent physical examination, a chest X-ray, and inoculations for smallpox, tetanus, poliomyelitis, and diphtheria before beginning clinical laboratory courses in the second year. Physical defects must be corrected at the student's own expense. Students are expected to assume initiative in following the health program. Undergraduate students should see details of health care requirements listed in the *Handbook* for Nursing Students, available from the University Book Store.

The School of Nursing reserves the privilege of retaining only those students who, in the judgment of the faculty, satisfy the requirements of scholarship, health, and personal suitability to the practice of nursing.

### Additional Expenses

Students should be prepared to pay the cost of transportation between the University campus and the teaching units. The use of a car may be required at any time in the program. Students should plan to allot approximately \$85-\$100 for the purchase of uniforms in the sophomore year and approximately \$2 for special achievement tests throughout the program.

### **Graduate Programs**

Also see "Graduate Programs and Degree Policies," page 57.

#### Associate Dean, Director of Graduate Programs

Dorothy M. Crowley T624 Health Sciences Teaching

Graduate Program Adviser

Edna Brandt T615 Health Sciences Teaching

The School of Nursing offers graduate curriculums leading to the degrees of Master of Arts and Master of Nursing. Also available are post-master's programs planned on an individual basis, including a doctoral minor for students matriculated in another discipline.

The graduate program in the School of Nursing is con-
sistent with the philosophy of the University of Washington Graduate School. It is assumed that the student enters with basic knowledge and nursing ability as a professional practitioner and that the student's undergraduate education has provided a foundation in the liberal arts. Graduate offerings provide opportunity for the student to increase clinical skills and to develop teaching and research skills.

The faculty recognizes that each student enters with individual goals and that the attainment of these goals will be achieved in various ways. Graduate study is characterized particularly by the student's involvement in independent study and research. Research, followed by the sharing of results for critical review of one's colleagues, is a component of all graduate programs. The results of independent study for the master's degree are set forth in a thesis:

The faculty believes that theories, concepts, and a scientific rationale underlie the nursing process. Theories and concepts from related fields are reconceptualized and applied in each of the specialty areas as appropriate.

As part of a graduate program, each student will have an opportunity to test nursing theory, to observe and analyze phenomena in the health care situation in a specific clinical area, to identify researchable problems, and to specialize in one area of knowledge. The currieulum also offers theory basic to teaching, administration, and clinical specialization in nursing. Opportunity for the application of these theories will be provided throughout the clinical field-experience. The student thus is given a base for continuing the refinement of these competencies after graduation.

Majors are offered in the following areas: comparative nursing care systems, family and community nursing, maternal-child nursing, physiological nursing, and psychosocial nursing. The major area includes advanced clinical study with opportunity for functional preparation in teaching, administration, and clinical specialization.

Most programs are four quarters in length, but the individual program may vary with the particular major field and the number of credits carried each quarter. At least half of the total credits taken must be in courses at the 500 level or above. Each student in the master's degree program carries out independent study in nursing and presents a written thesis. Within the first quarter of graduate study, the student should, with the help of the major adviser, plan an entire Program of Study in order to ensure a satisfactory sequence of courses.

# Master of Nursing Degree

Emphasis is on advanced preparation in an area of specialization in nursing. Supporting courses from at least two fields outside of nursing are required. Mastery of a foreign language is not required for this degree. A typical program would include: Major—advanced nursing courses (19 credits); related fields—courses in at least two other disciplines (12); and research—courses in research and thesis (14); total, 45 credits.

# **Master of Arts Degree**

The M.A. degree program includes a major in nursing and a minor in another discipline. Students are encouraged to select a minor that will serve as a basis for further, post-master's study. Students are expected to meet the undergraduate prerequisites of the minor department. The required course work and the exact number of credits for the minor are determined by the minor department. A student seeking this degree must demonstrate a reading knowledge of one foreign language. A typical program: Major—advanced nursing courses (19 credits); minor—courses in another discipline (12 minimum); research—courses in research and thesis (14); total, 45 credits minimum.

#### **Post-Master's Degree Programs**

Students who hold the master's degree may enroll for an additional period of study at the post-master's level to gain additional depth in an area of study, added breadth of preparation, and increased knowledge and skill in nursing research. The opportunity for post-master's study is offered in selected areas, such as care of the patient dependent on alcohol, care of the handicapped child, and cardiovascular nursing. Individual programs of study are planned in relation to the student's scholarly interests and long-range professional goals.

# Nurse Science Programs

Although the University of Washington does not currently offer a doctorate in nursing, the following patterns of program planning are open to qualified professional nurses: (1) nurse scientist program plan, (2) predoctoral programs in related fields, and (3) special individual Ph.D. program.

The nurse scientist program plan is designed to prepare a nurse scientist and leads to a Doctor of Philosophy degree with a major in the fields of anthropology, microbiology, physiology, or sociology. A predoctoral minor in nursing, consisting of a total of 35 graduate credits, of which at least half are in courses at the 500 level, is an integral part of this program. The sequence of courses for each individual is determined on the basis of previous preparation and goals.



Professional nurses who wish to extend formal study and to increase scholarly and research competence through doctoral preparation in a specific field related to nursing, such as business administration, education, genetics, history, or one of the sciences related to their professional goals, may apply directly to the predoctoral program in that field. If desired, a predoctoral minor in nursing may be planned to meet the student's needs.

A limited number of research assistant and teaching assistant positions are available to qualified premaster's, post-master's, and predoctoral students. Information can be obtained from the graduate program adviser's office.

The special individual Ph.D. program offered by the University's Graduate School is a unique researchoriented program in two or more disciplines. Designed for exceptionally able and unusually well-qualified students, the program is available to'a limited number of applicants. Additional information appears in the "Graduate Study" section of this catalog.

# **Admission to Graduate Standing**

Admission to the graduate programs of the School of

Nursing requires acceptance by the Graduate School as well as admission to the School of Nursing. Additional information appears in the "Graduate Study" section of this catalog. Applicants must be graduates of a baccalaureate program with an upper-division major in nursing comparable to that of the University of Washington School of Nursing. Transcripts of applicants who are graduates of programs not accredited by the National League of Nursing are evaluated on an individual basis. Professional experience is not required prior to admission to the graduate program. Completion of the Graduate Record Examination (aptitude test) and completion of a basic course in statistics are required prior to admission.

# **Extra Fees and Expenses**

Graduate students who are matriculated in advanced degree programs should plan to have available approximately \$150 for costs connected with the preparation of the master's thesis. Selected field instruction may be in one of several agencies either in or outside of Seattle. All students are required to provide their own transportation and should be prepared to have a car available for use.



# PHARMACY

Dean Jack E. Orr 102 Bagley

Men and women qualified for professional service in one or more of the fields of pharmaceutical practice are essential in the health care delivery system of today's society.

The University of Washington School of Pharmacy provides an instructional program, based on a five-year curriculum, that includes studies in liberal arts, business, basic sciences, and pharmaceutical sciences, and the application of this knowledge to good patient care. In addition, the school aspires to cultivate a high regard for professional ethics and the concept of service.

Many different opportunities exist for pharmacists as members of the professional team providing health care to the public. Holders of the Bachelor of Science in Pharmacy degree may be found in a variety of settings wherever pharmaceutical services are rendered. The majority of graduates engage in the community practice of pharmacy, and many are owners or part owners of pharmacies. Still others become pharmacists in hospital and clinic pharmacies; professional representatives of pharmaceutical manufacturers; production, control, or research pharmacists in the manufacture of medicinal and other pharmaceutical products; personnel in wholesale drug distribution; food- and drug-control chemists or inspectors for governmental health agencies; or pharmaceutical association executives.

The search for new knowledge to achieve the major goals of the health professions, the maintenance of public health and the relief of human ills, is carried on through advanced research. The graduate programs are designed to prepare advanced students for research, teaching careers, or specialized levels of professional practice.

The School of Pharmacy is a member of the American Association of Colleges of Pharmacy. It is accredited by the American Council on Pharmaceutical Education.

The University of Washington School of Pharmacy was founded in 1894, when it offered a two-year course of study. This was followed by three- and four-year programs. In 1957, the school adopted a five-year curriculum, which is continually being revised to prepare the pharmacy graduate for the ever-changing practice of pharmacy. The latest change, recently effected, was the introduction to the curriculum of patient-oriented clinical pharmacy. Since 1925, the school has accepted prospective candidates for the degree of Doctor of Philosophy with specialization in various areas of the pharmaceutical sciences.

# School and Related Facilities

The School of Pharmacy is located in Bagley Hall,

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which it shares with the Department of Chemistry. Among the school's facilities in Bagley Hall are the pharmacy undergraduate and graduate laboratories, advisory office, faculty offices, stockroom, and the drug service department. The State Food and Drug Laboratory also is housed in Bagley Hall. Many of the pharmacy classes are taught in Bagley Hall, but because a number of courses are taught by faculty members of the various departments of the School of Medicine, these classes are held, as are the clinical pharmacy courses, in the Health Sciences Center and the University Hospital.

The University Hospital, the Harborview Medical Center, the Children's Orthopedic Hospital and Medical Center, the Veterans Administration Hospital, and other Seattle area hospitals serve as training facilities for undergraduate and graduate students in clinical pharmacy. Students are assigned to various clinical areas of the hospital and outpatient clinics, where they relate complex drug therapy to disease state and treatment planning.

The Drug Information Service is operated by the School of Pharmacy with the cooperation of the Health Sciences Library. Located in the Health Sciences Library, the service provides drug information and consultation to qualified health professionals and serves as a teaching laboratory for students in the clinical pharmacy program.

The University Hospital pharmacy and the Hall Health Center pharmacy serve as training facilities for the school. Senior students who so elect are assigned to these pharmacies, where they gain practical experience in prescription practice under the direction of staff pharmacists. The University Hospital pharmacy and seventeen other hospital pharmacies in Seattle serve as laboratories for undergraduate and graduate programs in hospital pharmacy. The hospitals' chief pharmacists, each of whom holds a clinical faculty appointment in pharmacy, direct the laboratory instruction.

The drug plant gardens comprise approximately three acres of formal plantings adjoining a laboratory building and greenhouse. These facilities are utilized for instruction of undergraduate and graduate students, for research, for reference source materials in plant identification in poison control, and for continuing educational and public educational purposes.

The drug service facility manufactures specialized pharmaceutical preparations for the schools of Medicine and Dentistry, Hall Health Center, the University Hospital, and other divisions of the University. Much of the work done by this facility is in drug formulation, product development, and preparation of dosage forms to be used in clinical and experimental research.

The school maintains a laboratory that performs the analysis of food products for the Director of the State Department of Agriculture, of drugs for the State Board of Pharmacy, and of alcoholic beverages for the State Liquor Control Board. The Dean of the school is the state chemist.

# **Student Organizations**

Students are encouraged to participate in one or more campus organizations, especially the following organizations for pharmacy students: the student chapter of the American Pharmaceutical Association, national pharmaceutical association for the promotion of pharmacy (the chapter is also an affiliate of the Washington State Pharmaceutical Association); Kappa Psi, men's professional fraternity; Lambda Kappa Sigma, women's professional sorority; or Rho Chi, pharmaceutical honor society. All of these groups are affiliated with their respective national organizations, the first three of which have graduate groups throughout the nation and encourage continued participation after graduation.

# Employment

As positions become available in pharmacies, they are posted for qualified applicants by the School of Pharmacy.

# PHARMACEUTICAL SCIENCES 303 Bagley

200 248

# Faculty

Lynn R. Brady, Chairman; Allen, Brady, Elmer, Fischer, Goodrich (emeritus), Huitric, Krupski, Levy, McCarthy, Nelson, Spitznagle, Trager, Vincenzi.

The Department of Pharmaceutical Sciences provides the pharmaceutical sciences component of the pharmacy curriculum. Courses include background training in bionucleonics, biopharmaceutics, pharmacokinetics, mechanisms of drug action and drug metabolism, medicinal chemistry, pharmaceutical analysis; and 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 radio pharmaceuticals are cooperative efforts with research groups in the School of Medicine.

# PHARMACY PRACTICE

306 Bagley

# Faculty

Donald L. Sorby, Chairman; Hall, Hammarlund, Ivey, Kradjan, Orr, Pittle, E. Plein, J. Plein, Rising (emeritus), Smith, Sorby.

The Department of Pharmacy Practice is responsible for the components of the pharmacy curriculum that specifically relate to the provision of professional pharmaceutical services. These include courses in dispensing pharmacy, clinical pharmacy, hospital pharmacy, manufacturing pharmacy, and pharmacy administration. Courses concerning pharmacotherapeutics and drugs in society are also provided for nonpharmacy majors. Development and evaluation of innovative teaching techniques also receive major attention.

A pharmacy externship program is currently under development to provide students a better opportunity to relate their academic educations to professional pharmacy practice. In recognition of the importance of continuation of education after graduation, programs and seminars are presented annually to graduate pharmacists. The Department of Pharmacy Practice is administratively responsible for operating the Hall Health Center pharmacy, the Drug Service Laboratory, and the Drug Information Service. These facilities are also used as teaching sites for pharmacy students.

Faculty members of the Department of Pharmacy Practice conduct research programs on methods of delivery of pharmaceutical services in health care and on optimizing drug effects in patients.

# Undergraduate Program

Adviser

Louis Fischer 300 Bagley

#### **Bachelor of Science in Pharmacy Degree**

The pharmacy program is a five-year course of study that leads to a Bachelor of Science in Pharmacy degree. The final three years must be spent in residence in the School of Pharmacy. Students working toward the bachelor's degree in pharmacy must meet certain general requirements of the University and the following school requirements: Completion of the prescribed curriculum, with a minimum of 225 academic credits, and with a cumulative grade-point average of 2.00 in the professional courses and an overall cumulative average of 2.00. No more than 18 credits in advanced ROTC courses, no more than 3 credits in physical education activity courses numbered 100–199, no more than 6 credits in PHARM 495, and no more than 6 credits in professional courses numbered 499 may be applied toward graduation.

Admission Requirements: Freshman admission requirements for the School of Pharmacy are those of the University. The School of Pharmacy is limited in the number of transfer students it can accept into the second-through-fifth-year classes. In addition to applying to the University of Washington, transfer students desiring to enroll in pharmacy must apply to the School of Pharmacy and submit a complete set of all transcripts to the following address: University of Washington, School of Pharmacy, Director of Student Affairs, BG-20, Seattle, Washington 98195.

To receive first consideration for admission, applicants must submit applications and complete up-to-date scholastic records to both the School of Pharmacy and the Office of Undergraduate Admissions prior to April 1, a date which applies only to applications for pharmacy, not to other schools or colleges in the University. Students usually are admitted to the School of Pharmacy only at the beginning of Autumn Quarter.

Students who have submitted applications will be contacted by telephone or mail for the arranging of a personal interview. In lieu of an interview, out-of-state applicants who find it a hardship to appear may submit three letters of recommendation, of which two must be from science professors.

An applicant who is admissible to the University is not necessarily assured of admission to the School of Pharmacy.

# LICENSURE

In order to be admitted to the practice of pharmacy as a registered pharmacist in the state of Washington, the applicant must graduate from an accredited school of pharmacy, must complete the internship requirements as prescribed, and must pass the licensing examination.

After enrollment in the School of Pharmacy, the student should file an application with the State Board of Pharmacy for registration as a pharmacy intern. The board



establishes the nature and amount of internship experience required prior to the licensing examination, which may be taken after completion of the internship requirement.

Additional information about licensure requirements may be obtained from the State Board of Pharmacy, Washington Education Association Building, 319 East Seventh Avenue, Olympia, Washington 98501.

# CURRICULUM

The curriculum continually is being revised as new courses are made available to meet the changing needs of the pharmacy profession. A copy of the latest revision may be obtained on request.

# First Year

Winter Quarter: CHEM 150, General Chemistry (4 credits); CHEM 151, General Chemistry Laboratory (2); ENGL 172, College Writing (3); MATH 124 or 157, Calculus (5 or 4); PHYS 114, General Physics (4); PHYS 117, General Physics Laboratory (1) (student exempt if physics was taken in high school; total—18–19.

Spring Quarter: CHEM 160, General Chemistry (4 credits); English or speech (2-3); PHYS 115, General Physics (4); PHYS 118, General Physics Laboratory (1) (student exempt if physics was taken in high school); approved electives (3); total—14–15.

# Second Year

Autumn Quarter: BIOL 210, Introductory Biology (5 credits); CHEM 231, Organic Chemistry (3); CHEM 241, Organic Chemistry Laboratory (2); PHYS 116, General Physics (4); PHYS 119, General Physics Laboratory (1) (student exempt if physics was taken in high school); total—15.

Winter Quarter: BIOL 211, Introductory Biology (5 credits); CHEM 235, Organic Chemistry (3); CHEM 242, Organic Chemistry Laboratory (2); approved electives (5); total-15.

Spring Quarter: BIOL 212, Introductory Biology (5 credits); CHEM 236, Organic Chemistry (3); approved electives (7); total—15.

# Third Year

Autumn Quarter: PHSCI 320, Pharmaceutical Sciences

Laboratory (3 credits); PHARM 328-, Pharmaceutical Calculations (0-); PHARM 331, General and Physical Principles (4); P B10 360, General Human Physiology (5); approved electives (2); total-14.

Winter Quarter: BIOC 405, Introduction to Biochemistry (5 credits); PHSCI 321, Pharmaceutical Sciences Laboratory (2); PHSCI 332, General and Physical Principles (3); PHARM -329-, Pharmaceutical Calculations (-0-); approved electives (5); total-15.

Spring Quarter: B STR 301, General Anatomy (4 credits); MICRO 301, General Microbiology (3); MICRO 302, General Microbiology Laboratory (2); PHSCI 400, Biophysical Medicinal Chemistry (4); PHARM -330, Pharmaceutical Calculations (-1); approved electives (2); total—16.

### Fourth Year

Autumn Quarter: PATH 310, General Pathology (3 credits); PHCOL 401, General Pharmacology (5); PHSCI 412, Pharmacognosy (3); PHSCI 440, Medicinal Chemistry (4); total—15.

*Winter Quarter:* PHCOL 402, General Pharmacology (5 credits); PHSCI 413, Pharmacognosy (3); PHSCI 441, Medicinal Chemistry (4); approved electives (3); total—15.

Spring Quarter: PHARM 450, Pharmacy Laws (3 credits); PHSCI 405, Biopharmacy and Pharmacokinetics (5); PHSCI 414, Pharmacognosy (2); PHSCI 442, Medicinal Chemistry (3); approved electives (2); total—15.

# Fifth Year

Autumn Quarter: PHARM 407, Prescription Practice (4 credits); PHARM 484, Introduction to Clinical Pharmacy (5); approved electives (6); total—15.

Winter Quarter: PHSCI 497, Toxicology (2 credits); PHARM 408, Evaluation of Drug Products (3); approved electives (10); total—15.

Spring Quarter: PHARM 452, Contemporary Problems (1 credit); approved electives (14); total—15.

# PHARMACEUTICAL SCIENCES

Graduate Programs Graduate Program Adviser Jack E. Orr 102 Bagley

The Department of Pharmaceutical Sciences offers programs of graduate study leading to the degrees of Master of Science and Doctor of Philosophy. The programs provide opportunities for acquiring advanced expertise in bionucleonics, biopharmaceutics, medicinal chemistry, pharmaceutical chemistry, pharmaceutics, or pharmacognosy. These pharmaceutical sciences apply diverse disciplinary knowledge and techniques to pharmaceutical problems related to bioavailability and pharmacokinetics, drug design, drug metabolism, formulation, production, and quality control, can qualify the graduate to assume a place in teaching, research, manufacturing, or other health service affiliation.

When substantive information is available, permission may be granted upon petition for the student to bypass the master's degree and to proceed directly into a doctorate program. Evidence for reading competence in one foreign language (French, German, Japanese, or Russian) is required of all graduate students, and the student who has not satisfied this requirement prior to admission is expected to do so at the earliest opportunity. Academic accomplishments and progress toward meeting the requirements of the projected degree program for each student are reviewed at six-month intervals by a departmental graduate evaluations committee.

Admission Requirements: Students who intend to work toward a Master of Science or Doctor of Philosophy degree must apply for admission to the Graduate School and meet the requirements outlined in the "Graduate Study" section of this catalog. Graduate students must satisfy the requirements for an advanced degree in force at the time the degree is to be awarded. Graduate study requires approval of the Graduate School and the Department of Pharmaceutical Sciences.

Students with undergraduate degrees in pharmacy or in the biological or physical sciences are accepted for graduate study in the pharmaceutical sciences. Undergraduates who plan to pursue graduate study may expedite their programs by selection of pertinent electives. Although the choice of electives varies with the student's selected field in the pharmaceutical sciences, graduate study requires adequate preparation in mathematics and in the biological and physical sciences.

# **Master of Science Degree**

A student in the M.S. degree program must present at least 27 credits of course work, exclusive of thesis and nonthesis research. The student also must complete a research project, prepare an acceptable thesis, and pass a final examination.

# Doctor of Philosophy Degree

A student in the Ph.D. program must present a minimum total of 45 credits of course work, exclusive of dissertation and nonthesis research. The credits earned for the master's degree may be applied toward the doctoral degree. The student must pass a General Examination for admission to candidacy for the doctoral degree, complete a research project, prepare an acceptable dissertation, and pass a Final Examination. The research for the doctoral degree must be done at the University of Washington.

# PHARMACY PRACTICE

**Graduate Programs** 

Graduate Program Adviser Jack E. Orr 102 Bagley

The Department of Pharmacy Practice offers programs of graduate study leading to the Master of Science degree. The programs provide a broad education in pharmacy and the allied supporting sciences, completion of which can qualify the graduate to assume a place in pharmacy teaching, research, manufacturing or hospital pharmacy, or in other advanced levels of professional practice.

These programs combine formal course work with independent study and research training in the area of specialization. The choice of adviser and research problem is a matter of mutual consent between the student and faculty member. Course work taken by the graduate student depends upon his background and chosen area of specialization. All programs including research and preparation of the thesis usually are completed within a two-year period.

Admission Requirements: A student with an undergraduate degree in pharmacy and who meets requirements for admission to the Graduate School is eligible to apply for graduate study in the Department of Pharmacy Practice. For students interested in advanced clinical pharmacy work, it is highly desirable that their undergraduate preparation include completion of a clinical clerkship or externship as well as courses in such basic biomedical sciences as pathology, anatomy, and biochemistry.

# Master of Science Degree

A student in the M.S. degree program must present at least 27 credits of course work, exclusive of thesis and nonthesis research. The student also must complete a research project, prepare an acceptable thesis, and pass a final examination.



# PUBLIC AFFAIRS

Dean

Brewster C. Denny 266 Smith

# Faculty and Cooperating Faculty

Bergman, Brown, Crutchfield, Denny, Hashimoto, Johnson, Kroll, Lyden, Marts, Miles, Miller, Pealy, Richardson, Shipman, Trosper, Wenk, Williams, Wolfle, Wolters. M. Eric Wolters, graduate program adviser.

#### **Graduate Program**

# **Master of Public Administration**

Graduate School of Public Affairs is a graduate professional school providing education and research for the public service. The school offers a program of studies leading to the degree of Master of Public Administration, designed to prepare the student for service as a professional administrator in the public service at all levels—local, state, national, and international.

Graduates serve in such varied positions as foreignservice 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 in the nature and historical background of American institutions, basic preparation in general economics and statistics, and a mature capacity to digest reading and to express ideas in clear and lucid English. The student who lacks sufficient background in these areas may be required to make up these deficiencies by taking or auditing appropriate courses in addition to the course requirements for the degree.

Graduation Requirements: Ordinarily, the degree of Master of Public Administration is awarded upon the successful completion of two years of course work, or 60 quarter credits, an internship, and a degree project. Specific courses required or taken depend upon the curricular option selected and the student's interests. This is a nonthesis program. There is no formal foreignlanguage requirement.

A student may select a field of emphasis from two gen-

eral 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 concerned 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, Ancrum, Anderson, Beasley, Bergman, Bergner, Blackman, Boatman, Bobbitt, Boscha, Breslow, Breysse, Browder, Callen, Cooney, Day, Demers, Diehr, Discher, Emanuel, Erbstoeszer, Erickson, Feigl, Felton, Fish, Fisher, Foster, Fox, Foy, Frank, Gale, Gilson, Grayston, Hakomori, Hall, Hatlen, Hibbard, Holub, Hoover, Jackson, Joplin, Kanarek, Kaplan, Kenny, Kleinman, Kronmal, Kunstadter, Kuo, Lagace, Lawrence, Lee, MacIsaac, Martin, McCaffree, Mc-Carter, McCann, Mills, Milner, Mitchell, Newman, Ochoa, Peterson, Phillips, Reed, Richardson, Reiss, Seifert, Silberg, Stevens, Thompson, Van Dusen, Wahl, Walker, Wang, Weiss, 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, about 115,000 volumes, and some 3,300 journals relevant to all health professions. The school maintains its own General Automation SPC 16, Model 50, computer with a 32k storage capacity. Projects requiring a larger computer capacity can be handled through the adjacent Health Sciences Computer Center. Facilities for experimentation with animals, including primates, are available.

The school also maintains faculty members in a foreign setting, on Taiwan, where opportunities are provided for research and training in areas relevant to international health, as well as in comparative studies related to the diseases of worldwide occurrence and to delivery of health services. Affiliations exist with the United States Naval Medical Research Unit No. 2 and the Institute of Public Health, National Taiwan University. Local affiliations important to public health and community medicine exist with many Seattle hospitals and medical centers and with other state, community, official, and voluntary health agencies.

# Admission

Admission to the School of Public Health and Community Medicine is permitted only through one of the five departments. Inquiries concerning both degree program and residency training and related requests for applications should be directed to the departmental program advisers, as follows: Biostatistics, Paula Diehr, Ph.D.; Environmental Health, Jack Hatlen, M.S.; Epidemiology and International Health, John P. Fox, M.D.; Health Services, Ann Browder, M.D.; Pathobiology, George E. Kenny, Ph.D., or to the graduate program adviser, James L. Gale, M.D.

If there is a problem determining the proper department to which to apply, inquiries should be sent to the graduate program adviser. Letters of inquiry should indicate as clearly as possible the writer's educational background, relevant work experience, general area of interest, type of training desired, and possible career goals.

The Graduate School 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 wishes to study. Graduate School application forms will be sent to all persons interested in degree programs offered by this school. The school forms also will be considered complete when the following have been received:

By the Graduate School admissions office—the Graduate School application form; application fee; two copies of official transcripts covering all previous universitylevel education.

By the School of Public Health and Community Medicine—the School of Public Health and Community Medicine application form; a narrative statement indicating the education and career goals of the applicant; three letters of recommendation from persons competent to evaluate the applicant's professional abilities; test scores or interviews, if required.

Most training begins with Summer Quarter or Autumn Quarter. Some programs allow entry at other times of the year. The deadlines for applications are: Summer Quarter and Autumn Quarter, April 1; Winter Quarter, October 1; Spring Quarter, January 1.

Applicants are strongly encouraged to submit their applications well in advance of the deadline. Those whose native language is not English must establish their competence in English, which may be accomplished by the passing of an English language proficiency test.

# **Financial Aid**

Because of the withdrawal of federal support for training programs, no stipend support is generally available at this time. In individual cases, it may be possible to arrange limited financial support for students whose area of research and teaching overlap with areas supported by federal research grants. Such support can be on a limited basis only and must be arranged with the principal investigator of each individual grant. A limited number of teaching assistant positions may be available. Inquiries may be sent to the program adviser of the department in which the applicant has a major interest.

# **Undergraduate Program**

# **Bachelor of Science Degree**

The Department of Environmental Health, School of Public Health and Community Medicine, offers an environmental health curriculum leading to a Bachelor of



Science degree. This program prepares individuals for positions as environmental health specialists responsible for the recognition, identification, and change of environmental conditions hazardous to man. Such a specialist must have the skills necessary to motivate and educate the public toward change, as well as the ability to enforce environmental and public health laws.

A student in this program is expected to meet the distribution requirements as established by the College of Arts and Sciences. He or she should take additional courses in the social sciences and humanities that will help him or her develop an awareness and understanding of the social issues and limited skills or techniques in community planning and communications.

The environmental health major also is required to take technical courses important to future professional work. These courses cover environmental health problem areas, such as water and food sanitation, air and water pollution, vector control, solid-waste disposal, housing, institutional sanitation, occupational health, industrial hygiene and safety, and noise control. Toward the end of the student's academic training, he or she is required to write on an environmental health topic that has been investigated through research and as a study project. Summer field training is highly recommended and may be taken between the junior and senior years, during the senior year, or directly following graduation.

Graduates from this program generally will be employed by health departments and similar regulatory agencies. They will be in constant contact with the public in a never-ending variety of problem-solving situations aimed at enhancing man's environment as well as reducing its disease potential.

Graduation Requirements: All requirements for a degree from the College of Arts and Sciences must be met. A total of 50 credits is required in environmental health and closely related subjects.

Required environmental health courses and related health services administration and planning, biostatistics, and epidemiology courses include: PC EH 411, 440, 441, 442, 450, 453, 457, 480, 499; PC HS 323, 424; PC BS 472; PC EP 420.

Additional required or related courses: CHEM 140, 150, 151, 160, and 231, 232 or 102; BIOL 101–102 or 210, 211, 212; PHYS 114, 115, 116; MATH 105 or 106; MICRO 301; ENGL 171 or 271; BG&S 200; ECON 200; URB P 400.

Graduate Programs Graduate Program Adviser James L. Gale F358 Health Sciences

Available degree programs include the Master of Public Health, Master of Science in Public Health, Master of Health Administration, and Doctor of Philosophy. A prior doctoral degree ordinarily is required for the schoolwide Master of Public Health degree program, in which training is offered by the school's entire graduate faculty, although each student develops an area of specialization. Training for the master's or doctoral degree is offered by the faculties of departments or groups. All programs are flexible and designed to meet the background and needs of the individual student. However, to ensure adequate student preceptorship, admission to any of the programs is permitted only through a department. In general, master's level training requires a year of academic course work and another year of research. Admission to any of the degree programs requires admission to the University of Washington Graduate School, and usually at least a 3.00 grade-point average in the final two undergraduate years. Unless otherwise indicated, inquiries should be addressed to the departmental program advisers or to the graduate program adviser.

#### **Master of Public Health Degree**

The Master of Public Health degree is intended for the student who has an extensive background in human health and biology. In addition to meeting the requirements for admission to the Graduate School, an applicant for admission to the M.P.H. degree program is evaluated competitively with respect to: (1) past academic performance and ability; (2) adequacy of preparation (a prior doctoral degree in a health field or other appropriate qualification based on education, prior experience, and training); (3) intent to-pursue a career utilizing the training; and (4) acceptability to the department responsible for supervising the student's work in the designated area of concentration.

Each student in the program must choose an area of concentration, corresponding to one department of the school (usually Biostatistics, Environmental Health, Epidemiology and International Health, or Health Services), and in addition must complete a project leading to a written thesis. An applicant should indicate the desired area of concentration to ensure that resources exist within the school for suitable advising, individual studies, and a thesis project.

Breadth of knowledge in the field of public health constitutes an important objective of this degree. Although distributional requirements for courses are not specified, each applicant, in conjunction with the faculty and his or her advisory committee, plans a course of study at the beginning of the program that ensures this breadth. Changes and modifications of this plan during the student's enrollment are expected. Most students need 60 credits, and all students must obtain 9 thesis credits. The individual nature of each student's program, based on prior experience, prior training, and career objectives, results in a variation around this average recommended number of credits. In some instances, the program can be completed within four quarters. The school encourages use of challenge examinations, evaluation of prior training, and other mechanisms as alternatives to formal courses.

Concurrent credit as a resident in General Preventive Medicine is provided physician applicants for this degree. Because the Board of Preventive Medicine requires a minimum of one year of graduate study and two years of residency, students with prior residency training in a cognate clinical field may wish joint board certification. Two calendar years of preventive medicine residency often satisfies these various certification requirements, depending on the particular clinical specialty residency criteria and on prior or subsequent training in the clinical field. The American Board of Preventive Medicine also requires completion of an investigation leading to a written statement. The M.P.H. thesis generally satisfies this requirement.

Individuals who wish to pursue this degree on a parttime basis, often in conjunction with employment, usually require a longer calendar period to satisfy course, field study, and research experiences leading to acquisition of the degree.

Undertaken during the summer of 1974 was an experimental course amalgamating basic content from the areas of environmental health, health services, and epidemiology. Other modification and educational initiatives are being tested for their suitability in providing a more efficient learning experience for selected applicants for this degree.

# Other Master's Degrees

The Master of Science in Public Health degree program, requiring approximately the same number of credits and time as that for the Master of Public Health degree, is offered through the School of Public Health and Community Medicine.

A Master of Science degree in the field of biomathematics is offered by the Biomathematics Group, which includes certain faculty members from the colleges of Fisheries and Forest Resources, the departments of Genetics, Mathematics, Oceanography, Physiology and Biophysics, and Zoology, as well as from the School of Public Health and Community Medicine.

A Master of Health Administration degree is offered through the Health Administration and Planning Group, which includes certain faculty members from the schools of Business Administration, Nursing, Public Affairs, and Social Work, and the departments of Economics, Geography, Sociology, and Urban Planning, in addition to the School of Public Health and Community Medicine.

The programs administered by the School of Public Health and Community Medicine for the Master of Science in Public Health degree include the specialization of biostatistics training for health services research, environmental health, sanitation, industrial hygiene and safety, epidemiology and international health, health services, and pathobiology.

# BIOSTATISTICS

F363 Health Sciences

Chairman Donovan J. Thompson

The biostatistics-health services specialization prepares the student for technical positions in health research organizations and health care agencies. It emphasizes mastery of quantitative methods (statistics, operations research, systems analysis); elements of computer programming and data processing; and courses in epidemiiology, health economics, health administration, and related areas. A supervised period of work is included in a setting appropriate for gaining experience in the area. Applicants should have an interest in the quantitative assessment of the state of health of population groups and in the method and technique for judging the effectiveness of programs designed to conserve or improve health. (See also description of biomathematics program below for additional degree programs.)

# ENVIRONMENTAL HEALTH

F463. Health Sciences

Acting Chairman Donald R. Peterson

Students taking the environmental health specialization (sanitation, industrial hygiene, and safety) are prepared to serve as sanitarians, industrial hygienists, and environmental health management specialists for upper-



echelon positions in environmental health programs in official health agencies or in other government agencies utilizing environmental control or management personnel. They also may serve in private industry, in educational institutions, and in private consultation capacities. It is expected that applicants will have preparation in the relevant biological, physical, and social science areas. Preference is given those who have had undergraduate education or experience in environmental health practice. Students with such a background may complete their programs in six quarters. Those without it should expect to take seven or eight quarters, including field training.

# EPIDEMIOLOGY AND INTERNATIONAL HEALTH

F263 Health Sciences

#### Chairman

E. Russell Alexander

The objective of the epidemiology and international health specialization is to produce future academicians, highly qualified as investigators and teachers in the area of epidemiology, and well-trained practitioners of epidemiology. A doctorate in a health field is desirable for admission to the epidemiology and international health specialization, although applicants are considered if they have master's level or higher training in a relevant area, such as anthropology, biostatistics, microbiology, or nursing. The curriculum gives major emphasis to biostatistics and epidemiology, but it also is flexible in content to serve the particular goals of the individual student. The conduct of an independent study (original research or field project) constitutes the most important aspect of the program.

# HEALTH SERVICES

F358 Health Sciences

# Chairman

William C. Richardson

The health services specialization offers graduate training in two areas: community medicine and health services administration and planning (described below). Concentration in community medicine focuses on issues relating to the organization of medical care, including the evaluation of delivery models, assessment of quality of care, and developing and evaluating care for specific socioeconomic and ethnic groups. Extensive use is made of community agencies and resources. Students with a background in medicine or dentistry may approach this area of concentration as applicants for residency training in community medicine, for a master's degree, or for both. In exceptional cases, nonpostdoctoral students with appropriate community experience and background may be accepted for the Master of Science in Public Health degree program with an emphasis on community medicine.

# PATHOBIOLOGY

F161 Health Sciences

Chairman

George E. Kenny

The pathobiology specialization prepares the student for a career as a teacher, investigator, or manager of a clinical or public health laboratory. Pathobiology is defined as the study of pathogenic biological agents and their interactions with a host. The agents of interest range from multicellular parasites to viruses and also include tumors as a class of endogenous parasites. Host responses studied are primarily immunologic, although pathological and biochemical responses also are investigated. Training is solidly based in molecular biology with specific application to the study of infectious agents and host responses. Major course work in pathobiology is supplemented by appropriate courses in biochemistry, biostatistics, epidemiology, and microbiology. Admission preference is given a student with a baccalaureate degree in biology or biochemistry.

# BIOMATHEMATICS

The Biomathematics Group, in which the Department of Biostatistics faculty participates, offers training in mathematics, statistical analysis, and statistical theory. Career objectives include academic teaching and research, as well as positions in research or administrative agencies of federal or local government and private corporations. A career example might be the statistician who designs and analyzes clinical trials of new drug therapies. Fundamental courses in mathematical statistics and quantitative methods are generally integrated into an individual Program of Study through cooperative arrangements with the Department of Mathematics and with the Center for Ouantitative Science. This flexibility gives an excellent opportunity for biostatistics students to acquire a broad background in modern theoretical developments applicable to research activities in the health sciences. Information concerning the graduate program in biomathematics appears in the "Interdisciplinary Graduate Degree Programs" section of this catalog. Inquiries concerning this program should be addressed to Richard Kronmal, Ph.D., group chairman.

# HEALTH SERVICES ADMINISTRATION AND PLANNING

The Health Services Administration and Planning Group, administratively located in the Department of Health Services, accommodates degree applicants in one of three areas of concentration: hospital administration; medical care administration and organization; and comprehensive health planning. The curriculum is designed to be highly interdisciplinary, drawing on faculties from other academic units throughout the University (e.g., business, public affairs, and urban planning). Additional information about this degree program may be found in the "Interdisciplinary Graduate Degree Programs" section of this catalog. Inquiries about this program should be addressed to Chairman, Health Services Administration and Planning Group.

## **Doctor of Philosophy Degree**

Programs leading to the Ph.D. degree are offered by both the Department of Epidemiology and International Health and the Biomathematics Group, described in the "Interdisciplinary Graduate Degree Programs" section of this catalog. Both programs differ from the master's degree program principally in the nature and scope of the program's independent study project and the resulting dissertation, and in the expected time required to complete the program, a minimum of three years.

The epidemiology Ph.D. Candidate studies the distribution of disease in mankind and seeks to identify factors that influence its occurrence in human populations. Course work includes a basic series on epidemiology, one or more courses in biostatistics, and seminars in both of these fields. Electives are dictated by the individual student's interest. Soon after admission, he or she begins participation in an ongoing research project to gain familiarity with specific techniques and research methods. The student may plan and execute a particular minor phase of the project. The applicant for this program must have a degree in medicine, dentistry, or veterinary medicine, or be a qualified holder of a master's or higher degree, in a relevant field, such as nursing, microbiology, biostatistics, or an appropriate social science. Others who will be considered are students enrolled in the schools of Dentistry or Medicine

and recommended for the concurrent D.D.S-Ph.D. or M.D.-Ph.D. program.

# **Postdoctoral Training**

The school offers three-year residencies in general preventive medicine, approved by the American Board of Preventive Medicine, for training in the four subspecialty areas of epidemiology, environmental health, community medicine, and health services administration. Opportunity for combined residencies in general preventive medicine and pediatrics now exists, and a combined program with internal medicine is being developed. Depending on whether the candidate has taken a straight internship, which is counted as one year of residency in pediatrics and medicine, the residency requirements for two specialty boards may be satisfied by four or five years of postinternship training.

Graduates of accredited medical schools in the United States or Canada who have completed at least one year of internship are eligible for admission to these residency programs. Those seeking regular board certification must be licensed to practice in at least one of the states or in Canada. Foreign medical graduates who do not possess such a license but satisfactorily complete three years of approved residency training may seek special certification from the board (not valid in the United States or Canada). Acceptance into the program is on a competitive basis, the criteria being academic performance in medical school; overall professional competence, as judged from letters of recommendation from former teachers and supervisors; motivation in seeking training and relating it to career objectives as judged from narrative statements; and a personal interview when possible. All residency programs include formal course work as required by the American Board of Preventive Medicine, independent research, and supervised field experience.

Possessors of M.D. or Ph.D. degrees, not interested in degree programs or residency training, may be accommodated in advanced, specialized research training in their areas of interest. Such programs generally are for periods of not less than one year and are pursued under the supervision of individual senior faculty members. Interested persons may direct inquiries to the particular faculty member with whom they wish to work, if known to them, or to the appropriate departmental chairman.

# RESERVE OFFICER TRAINING PROGRAMS

The departments of Aerospace Studies, Military Science, and Naval Science, offer ROTC programs under agreements between the University and the United States Air Force, Army, and Navy. Eligible freshman students may enroll in any one of the ROTC programs. Transfer or currently enrolled students who plan to attend the University at least six more quarters, excluding summer sessions, may apply for enrollment in ROTC. Participation in ROTC is elective.

The Department of Military Science offers a traditional four-year, a modified three-year, and a special two-year program, each of which leads to a commission as a second lieutenant in the Army.

The Department of Naval Science offers both a four-year and a two-year program that may lead to a commission in the Navy or Marine Corps.

The Air Force program consists of a two-year general military course and a two-year professional officer course, which lead to a commission as a second lieutenant in the United States Air Force. Any qualified male or female student may enroll in the general military course. Each qualified entering freshman may register for Air Force ROTC and be enrolled in the four-year program. Students to be given financial assistance are advised accordingly. Transfer students having eleven or more quarters remaining in school may also enroll in the four-year program. Students with at least two full years remaining in school may apply for the two-year program. AFROTC counselors are available at all times in the Department of Aerospace Studies.

Students given financial assistance and entering the advanced or upper-division ROTC program must agree in writing to complete the program and to accept a commission in the service for which they are educated.

The specific courses and requirements for each service are described in the following sections. The courses are taught by regular officers assigned to the University by the Army, Navy, Marine Corps, and Air Force.

# AEROSPACE STUDIES

Clark Hall

# Faculty

Col. James Hunt, USAF, Professor of Aerospace Studies; Armstrong, Boudreaux, Doggett.

The Air Force ROTC program is designed to provide for the development of skills and attitudes vital to the career professional Air Force officer. The graduate qualifies for a commission and enters upon active duty in the Air Force. The four-year Air Force ROTC program consists of a two-year general military course and a two-year professional officer course. Any qualified male or female student may enroll in the general military course. This program consists of one classroom hour and one corps training hour per week during the freshman and sophomore years. Uniforms and textbooks are furnished.

After completing the general military course, cadets may apply for entrance to the professional officer course. Entrance is competitive.

Cadets selected for enrollment in the professional officer course are enlisted in the Air Force Reserve, and receive subsistence pay of \$100 per month. They are furnished texts and uniforms and are required to attend three class periods and one corps training hour each week. Between the sophomore and junior years, each cadet is required to attend a four-week field training course at an Air Force base, for which he receives pay. Travel costs are paid by the Air Force.

#### **Financial Assistance Grant Program**

Each year a number of selected cadets in the four-year program are awarded AFROTC college scholarships. These cadets are enlisted in the Air Force Reserve and receive tuition, fees, books, uniforms, and \$100 subsistence per month. Course requirements are as described above.

# **Two-Year Air Force ROTC Program**

To provide for those students who are unable to participate in the four-year Air Force ROTC program, a two-year professional officer course is available on a competitive basis. Students in this program are required to attend a six-week field training course at an Air Force base during the summer preceding entry into this program. The student is paid during the six-week period. Course requirements, upon return to the campus, are as listed for the professional officer course. Uniform, texts, and \$100 subsistence per month are provided.

#### **Flight Training**

Flight training is available to physically qualified cadets during their senior year. The Air Force pays the costs incident to this training. Successful completion results in the receipt of a private pilot's license and further flight training after being commissioned, leading finally to becoming an Air Force pilot.

Inquiries about enrollment or other information should be addressed to the University of Washington, Professor of Aerospace Studies, Clark Hall, DU-10, Seattle, Washington 98195.

# MILITARY SCIENCE

145 Savery

#### Faculty

Col. Karl O. Kuckhahn, USA, Professor of Military Science; Bacon, Boling, Johnson, Knowlton.

The Department of Military Science offers the college student five elective options for the attainment of an Army officer's commission through Army ROTC while pursuing the academic degree of his choice.

# **Traditional Four-Year Program**

Open to incoming freshman men and women, this program leads to a commission in either the Regular Army or the Army Reserve. Academic studies include courses in military history and tactics, principles of leadership, techniques of instruction, management and staff procedures, logistics, and military law. Placement credit toward completion of ROTC courses may be given for prior ROTC or military training. All military textbooks and uniform items, plus a tax-free subsistence allowance during the junior and senior years of \$100 per month for a maximum of 20 months, are provided by the Army. The program requires four years of academic study on campus, as well as a six-week advanced camp training period between the junior and senior years, for which the cadet is paid both for time at camp and for travel expenses to and from the camp location. The program is divided into two courses: the basic (first and second years) and the advanced (third and fourth years). Enrollment in the advanced course requires selection by the Professor of Military Science. A student chosen for the advanced course must sign a contract wherein he agrees to complete the course, to enlist in the Army Reserve, to accept a commission if offered, and to serve on active duty for a period of two years after commissioning. A three-to-six-month option for active duty training with the balance of service in an active Army Reserve unit recently has been offered.

#### Modified Three-Year Program

This program is open to men and women of sophomore standing. The program is the same as that for the four-year program, except that the basic course (first and second years) is compressed into one year.

#### Special Two-Year Program

This program is open to upper-division or graduate men presently enrolled at the University or to upper-division or graduate transfer men from other colleges. This program requires attendance at a basic camp for six weeks between the sophomore and junior years in lieu of the basic (first and second years) course. The basic camp may not be necessary for veterans or others with 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. This program is scheduled to be open to women in 1975.

# Scholarship Program for Currently Enrolled Students

This program is open to men and women enrolled in ROTC. Selections are made on a regional level, based upon the recommendation of the Professor of Military Science. The scholarship provides financial assistance during the remaining years of the student's enrollment (up to three years). Each scholarship pays for tuition, books, and laboratory expenses and provides, in addition, \$100 per month, tax free. All other advantages and obligations are the same as those of the four-year scholarship program (see below).

# Four-Year Scholarship Program

Application for this program should be made while the student is still in high school. Selection of students is made on a nationwide competitive basis. This program leads to a commission in the Regular Army or the Army Reserve. All tuition, laboratory fees, textbooks, and uniform items, plus tax-free retainer pay of \$100 per month for a maximum of four years, are provided by the Army. The program requires four years of academic study on campus, as well as a six-week advanced camp training period between the junior and senior years, for which the cadet is paid for both his time and travel expense to and from the camp location. Academic studies are identical to those of the traditional four-year program. The student must sign a contract (with the consent of parents, if under eighteen years of age) wherein he or she agrees to complete the program, to enlist in the Army Reserve, to accept a commission, if offered, and to serve on active duty for four years after commissioning.

#### Flight Training

Flight training is available to interested cadets after completion of the first year of the advanced course. Successful completion of this training may lead to receipt of a private pilot's license and assignment as an Army aviator.

#### Uniforms

Students in the basic program are provided uniforms, which are turned in at the completion of the basic course. Students in the advanced program are provided new uniforms, which become their personal property when commissioned. Uniforms are worn at all leadership laboratory classes and when otherwise specified. At the time of registration, all students, except those on scholarships, must make a \$25 deposit, which is refunded when the uniform and textbooks are returned undamaged.

Inquiries about enrollment or other information should be addressed to the University of Washington, Professor of Military Science, 145 Savery, DK-10, Seattle, Washington 98195.

# NAVAL SCIENCE

309 Clark

#### Faculty

Col. William H. Rice, USMC, Professor of Naval Science; Beltz, Egan, Foucht, Karr, Medford, Rider.

The Department of Naval Science offers University students the opportunity to engage in study leading to a commission in the United States Navy or Marine Corps while working toward a baccalaureate degree in an academic field. Two programs are offered.

## Navy-Marine College Program

Each year a number of young men and women are accepted for four-year and two-year college programs. For the four-year program, the professor of naval science accepts applications from qualified students just prior to the beginning of Autumn Quarter. Applications for the two-year program are accepted from current sophomores in community college or four-year colleges and must be received prior to May 1.

Those students selected for the two-year program attend a six-week course of instruction at the Naval Science Institute (NSI) during the summer prior to their junior year. Successful completion of NSI qualifies students for enrollment in the advanced course in the NROTC program. NROTC college program students pay their own college expenses, but receive subsistence pay of \$100 per month during their junior and senior years, including the intervening summer.

The Navy furnishes the uniforms and textbooks used in naval science courses. College program students may obtain scholarships through various avenues, including the national competition and direct appointments by the professor of naval science. Upon graduation, college program students are commissioned in the Navy Reserve or Marine Corps Reserve and serve on active duty for three years.

# **Navy-Marine Scholarship Program**

Each year a number of young men and women are accepted for scholarship status in the four-year naval ROTC scholarship program and the two-year nuclear propulsion scholarship program. Selection for the fouryear program is based upon nationwide competition and selection by a central selection committee. Application must be made by November 15 of the academic year preceding appointment as midshipman. Those selected are provided educational benefits, including subsidy by the Navy of all tuition fees, textbooks, and uniforms, and \$100 per month in subsistence pay. For the two-year nuclear propulsion scholarship program, applications from current sophomores, or juniors in five-year programs of study, must be received prior to April 1. Those selected by a central selection board, attend a six-week course of instruction at the Naval Science Institute (NSI) during the summer prior to their junior year. Successful completion of NSI qualifies these students for enrollment in the advanced course in the NROTC scholarship program. Scholarship students

are appointed as midshipmen, USNR, and upon graduation are commissioned a regular officers in the United States Navy or Marine Corps.

All naval ROTC students take the same naval science courses during the first two years. Students who elect to be commissioned in the Marine Corps take Marine Corps subjects during their third and fourth years. A flight instruction program is available for physically qualified students interested in becoming naval aviators. Successful completion of the program results in qualification for a private pilot's license and consideration for assignment to naval flight training and designation as a naval aviator.

Additional information concerning the Naval ROTC Programs may be obtained by writing the University of Washington, Professor of Naval Science, 309 Clark, DU-10, Seattle, Washington 98195, or by visiting the NROTC unit on the campus.



# SOCIAL WORK

response to this need, as well as to the rapid changes occurring in society, in the broad field of social welfare, and in the profession of social work, the School of Social Work has developed programs that have as their primary objective the preparation of persons for competent performance in a wide variety of professional roles and functions. The school's undergraduate, graduate, and continuing education offerings are designed to equip students possessing differing academic and experience backgrounds with the knowledge and skills needed for improved practice. Consistent with the aims of the University, the program of the School of Social Work has three major objectives: (1) the transmission of existing knowledge through the professional curriculum and participation in instructional offerings of other units of the University; (2) the acquisition of new knowledge through research and scholarship by the faculty and students; and (3) service to the community through collaborative training programs, sponsorship of professional institutes, and consultation.

#### **Undergraduate Program**

Director William C. Berleman 109 Eagleson

The School of Social Work undergraduate program prepares students to receive a Bachelor of Arts degree with a major in the field of social welfare. Students who desire a basic liberal arts background with concentra-

# Dean

Scott Briar 204 Eagleson

Associate Dean

Calvin Y. Takagi 205 Eagleson

## **Assistant Dean**

Jack A. N. Ellis 207 Eagleson

# Faculty

Allen, Anderson, Beatty, Bentz, Berleman, Berlin, Bracht, Briar, Brink, Bryant, Chambliss, Dear, Dixon, Duplica, Ellis, Farber, Goodman, Griswold, Gronewold (emeritus), Hanneman, Herrick, Hutchins, Hunt (emeritus), Ishisaka, Jaffee, Kelley, Klingbeil, Krisologo, Leigh, Lewin, C. Macdonald, R. Macdonald, Maier, Meld, F. Miller, S. Miller, Mochizuki, Mundt, Mykut, Northwood, Norton, Ochoa, Parsons, Patti, Resnick, Richey, Roffman, Smith (emeritur), Stier, Streshinsky, Takagi, Teather, Weller, Whittaker.

The marked growth in the magnitude, complexity, and intensity of such social problems as poverty, racism, urban unrest, physical and mental illness, and crime and delinquency during the last forty years has generated the need for new, enlarged, and more effective social welfare programs to meet these problems. In tion in social welfare and the social and behavioral sciences may satisfy their interests by enrollment in this major. Specific objectives include preparation for human services occupations at the beginning level of practice competence, for graduate education in social work or related fields, as well as for informed participation in contemporary society. Students interested in other fields and disciplines have an opportunity to add an enriching experience to their program of study.

The education of students in an applied profession calls for integration of academic training and practical learning. The social welfare program is designed to provide students with the basic liberal arts and with an introduction to the theory and practice of social work. Requirements include introductory courses in social welfare policy, social welfare research, and the theory and practice of social work. In addition, students are required to take at least one course concerned with the racial ethnic minorities and are expected to supplement their programs with relevant elective courses offered through the School of Social Work and elsewhere in the University. Classroom study during the senior year is accompanied by an extended practicum in a number of social agencies in which students participate directly in the provision of social services. Students interested in pursuing a particular practice specialty or academic theme are encouraged to do so, and efforts are made to build classroom and practicum experiences around this specialization whenever possible. Examples of themes might be the child and family in contemporary society; social welfare policy and the legislative process; or minority groups and the provision of social services.

An increasing number of elective and specialized offerings in social welfare are available as service courses to students in other schools and colleges of the University.

## Admission

Students contemplating this major spend their freshman and sophomore years as premajors, fulfilling the distribution requirements set forth by the College of Arts and Sciences. They should have junior status (90 credits) at the time of their admission to the program. Thenceforth, they are advised by the school's undergraduate program adviser. Additional information about admission procedures and an application form are available at the undergraduate social welfare office, 109 Eagleson.

# **Financial Aid**

Information concerning scholarship awards, fellowships, stipends, and loans may be obtained from the Office of Student Financial Aid, 170 Schmitz, and from the Chairman, Scholarship Committee, School of Social Work. A limited number of awards are available to graduate students.

# Graduate Program.

# Graduate Program Adviser Catherine J. Macdonald

Admission to the graduate professional program of the School of Social Work requires formal admission to the Graduate School as well as to the School of Social Work; hence, separate application forms should be submitted.

#### Master of Social Work Degree

A two-year program of study leads to the Master of Social Work degree. Students are prepared for professional work in social agencies and for programs serving / individuals, families, and small groups. Graduates also may work in various capacities with governmental or community groups and organizations in social planning, research, or administrative activities. Consistent with its responsibility to the profession and to the public, the school exercises discretionary judgment concerning the suitability of students for admission to, or continuation in, the degree program.

The curriculum is composed of courses concerned with issues of social welfare; the philosophy, organization, and administration of service delivery systems; social work practice; human behavior and social change; and research methods. A field instructional experience or practicum integral to the educational program is offered.

In the second and third quarters, this field experience is concurrent with classwork; in the fourth and fifth quarters, it is a block plan wherein students spend up to five days a week in the field. Thus, through a blending of theory and practice, the student acquires the knowledge and skills necessary for professional competence.

In the course of his or her graduate education, the student, with the assistance of an academic adviser, chooses one of three major tracks: human services, community and organizational development, or research services. Within each of the tracks, the student elects a major area of specialization that defines the focus of his or her didactic and practicum courses.

Track 1, Human Services: Choices for major— (1) childhood and adolescence; (2) youth and young adulthood; (3) middle age and aging.



Track II, Community and Organizational Development: Choices for major—(1) social planning; (2) community development and social action; (3) organizational development.

Track III, Research Services: In combination with—(1) human services; (2) community and organizational development.

Requirements for the degree include completion of the prescribed curriculum and a minimum of three quarters in residence at the school. Each student must present a total of 68 quarter credits in passing work and maintain a 3.00 grade-point average in all courses numbered 400 and above. No more than 6 quarter credits of work of

less than B quality is accepted. The degree is awarded on the basis of the student's competence in theory and practice, as evidenced through satisfactory completion of class and practicum and through advisory committee assessment.

In addition to tuition costs and general fees, each student must plan for the costs of transportation to and from field instruction agencies.

# **Courses for Non-Social Work Majors**

Class enrollment permitting, and with permission, a number of courses are available to students enrolled in other graduate and professional departments of the University. These are: SOC W 500, 501, 502, 504, 505, 509, 510, 511, 520, 550, 551, 560, 580, and 590.





# DESCRIPTION OF COURSES

Colleges and schools are listed in alphabetical order in this section. Courses are arranged alphabetically by department under the heading of the college or school in which they are offered.

Courses numbered from 100 through 299 are lowerdivision courses for freshmen and sophomores; those numbered from 300 through 499 are upper-division courses for juniors, seniors, and fifth-year students.

Courses numbered 500 and above are intended for, and restricted to, graduate students. Some courses numbered in the 300s and 400s are open both to graduates and to upper-division undergraduates. Such courses, when acceptable to the major department and the Graduate School, may be part of the graduate program. The Graduate School accepts credit in approved 300-level courses for the minor or supporting fields only; approved 400-level courses are accepted as part of the major.

Undergraduate students of senior standing who wish to register for a 500-level course must obtain permission from both the instructor of the class and the Dean of the Graduate School.

The number in parentheses following the course title indicates the amount of credit each course carries. In most lecture courses, a credit is given for each weekly class hour during a quarter; laboratory courses generally carry less credit than the work time required. An asterisk in place of a credit number means that the amount of credit is variable.

The letters A, W, Sp, and S, following the number of credits, refers to the quarter or quarters in which the course is offered. A refers to Autumn Quarter, W to Winter, Sp to Spring, and S to Summer.

Each course number includes a group of letters, known as the prefix. This prefix must precede each course number on the Program of Studies.

Not all of these courses are offered every quarter. Final confirmation of courses to be offered, as well as a list of times and places of class meetings, is given in the *Time Schedule*, published each quarter. The three courses numbered 600, 700, and 800 are restricted to graduate students in the Graduate School. They appear by number and title only where applicable under the departmental course listings in this catalog. Descriptions for these courses are listed below. The asterisk (\*) following the course title indicates the amount of credit is variable.

# 600 Independent Study or Research (\*)

Individual readings or study, including independent study in preparation for doctoral examinations, research, etc. Prerequisite, permission of Supervisory Committee Chairman or Graduate Program Adviser. Name of faculty member responsible for supervising the student should be indicated on Program of Studies.

#### 700 Master's Thesis (\*)

Research for the master's thesis, including research preparatory or related thereto. Limited to 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 Intermediate graduate students, i.e., those who have completed the master's degree or the equivalent, or Candidate-level graduate students. Premaster students initiating doctoral dissertation research should register for 600. Prerequisite, permission of Supervisory Committee Chairman or Graduate Program Adviser, Name of faculty member responsible for supervising the student should be indicated on the Program of Studies.

# COLLEGE OF ARCHITECTURE AND URBAN PLANNING

# ARCHITECTURE

# **Courses for Undergraduates**

#### ARCH

150, 151 Appreciation of Architecture I, II (2,2) ASp,WS Pundt

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

#### American Architecture and Urban 250 Environments (2) Sp Pundt

Study and critical investigation of architecture and the problems of urban design in North America from colonial times to the present. Prerequisite, 151 or permission. For nonmajors.

#### ARCH

# 300, 301, 302 Introduction to Design:

Laboratory (6,6,6) AWSp,AWSp,AWSp Registration for credit in these courses permits the student to choose from among a number of sections that introduce design theories, methods, and processes. Sections are given in various studio-seminar-lecture formats and include subjects in four general groups; technological determinants of design; visual-theoretical determinants of design; sociobehavioral determinants of design; introduction to design synthesis sections. Detailed descriptions of work in all sections are available quarterly from the Department of Architure. Prerequisite, permission.

#### ARCH

# 303, 304, 305 Introduction to Design

Synthesis (3,3,3) 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 paraline drawing, photographic simulation, descriptive geometry, perspective, shade and shadow, computer graphics, and freehand drawing. Prerequisite, permission.

## ARCH

#### Introduction to Architectural 313 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 con-trols. 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

Architectural Sketching (2) AWSp 315 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 de-signing 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 forceresisting systems. Prerequisites, 321 and permission.

#### ARCH

#### 340, 341, 342 Overview of the Science of the Built Environment (3,3,3) A,W,Sp MacGowan

Overview lecture series investigating the technological means available for making the built environment effective as a modifier of natural climate to satisfy the needs of human comfort and well-being. The third quarter of the series includes an introduction to the mechanical, thermal, electrical, optical, and chemical properties of materials.

#### ARCH

#### Survey of Environmental Arts I (3) A 350 Hildebrand

Survey of architecture, city, and land form, from earliest times to circa 1150.

#### ARCH

#### 351 Survey of Environmental Arts II (3) W Hildebrand

Survey of architecture, city, and land form, from circa 1150 to 1750. Prerequisite, 350.

ARCH 352 Survey of Environmental Arts III (3) Sp Survey of architecture, city, and land form, from circa 1750 to the present. Prerequisite, 351.

#### ARCH

#### 400, 401, 402 Introduction to Architectural Design Laboratory (6,6,6) AWSpS, AWSp8,AWSp8

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

# 414 Architectural Sketching (3) A

| Sproule Exercises in freehand representational drawing using charcoal, graphite, and conte crayon with emphasis on line, proportion, values, and composition. Studies progress from geometric to nongeometric forms. Prerequisite, permission.

#### ARCH

#### 415 Photography for the Built Environment (2) AWSp Alden

Photographic approach to the collection, analysis, and presentation of visual information relevant to the design and evaluation of manmade environments. Case studies, lectures, and class discussions on technical, psychological, and visual problems, followed by five weeks of individual or team photographic projects resulting in completed visual or audiovisual presentations. Student must provide own camera with lens, shutter, and aperture controls. Prerequisite, 313 or permission.

#### ARCH

#### 416 Architectural Sketching (3) W Sproule

Introduction to the use of watercolor as a monochromatic medium in sketching and rendering with emphasis on proportion, value, and composition. Representational drawing ranges from geometric to nongeometric forms. Pre-requisite, 414. (Formerly 511.)

#### 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. (Formerly 512.)

# ARCHITECTURE AND URBAN PLANNING

# ARCHITECTURE AND URBAN PLANNING

#### ARCH

# 420 Structural Design I (4) AS

Albrecht, Radcliffe, Torrence Design of complete building frames in timber, laminated wood, and steel; considering earthquake resistance, building responses, continuity, and the structural design process. Prerequisites, 322 and permission.

#### ARCH

# 421 Structural Design II (4) AW

Albrecht, Radcliffe, Torrence Development of basic reinforced and pre-stressed concrete design process and design of continuous structures in reinforced concrete, employing beams, girders, and slabs. Prerequisites, 420 and permission.

#### ARCH

422 Structural Design III (4) WSp

Albrecht, Radcliffe, Torrence Design of reinforced concrete structures, including flat slabs and plates, columns, footings, shearwalls and retaining walls. Prerequisites, 421 and permission.

#### ARCH

426 Structural Unit Masonry (3) Sp Lebert

Structural behavior and design of reinforced brick, tile, and unit masonry structures. Offered jointly with the Department of Civil Engineering as CESM 487. Prerequisites, 421, 422 or permission.

#### ARCH

427 Architectural Problems (3-7) AWSpS

#### ARCH 430, 431, 432 The Science of the Built

Environment (3,3,3) A,W,Sp MacGowan

Study of microclimatic controls in the built environment with special emphasis on lighting, acoustics, and thermal phenomena. Lectures, laboratory work, and student presentations. Prerequisites, 340, 341, 342, or permission.

#### ARCH

#### Mechanical Equipment of Buildings-434 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 sew-age systems are similarly considered.

#### ARCH

#### 435 Mechanical Equipment of Buildings Electrical (2) W Lyons

Basic considerations for electrical power distribution in buildings, including elementary residential wiring design. Light sources and elementary lighting design concepts; evaluation of electric heating methods; sound and signal systems.

#### ARCH

Mechanical Equipment of Buildings-Heating and Ventilation (2) Sp 436

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

Laboratory in Human Needs Analysis (3) 441

#### ARCH

442 Social Implications of Architecture (3) Sp

#### ARCH

#### 447 Physical Structure and Human Interaction (2) W

Resnick, Sasanoff

For social work and architectural students examining the effect of physical structure on human interaction. Offered jointly with the School of Social Work as Social Work 447. Prerequisite, permission.

# ARCH

450 Survey of Environmental Arts (5) S Hildebrand

The environmental arts of architecture, landscape architecture, and urban planning. A historical evolution with special emphasis on factors shaping these arts in the Western world and the twentieth century. For nonmajors.

#### ARCH

#### 451 History of Modern Architecture (3) A Pundt

Study and critical analysis of major architectural achievements since the mid-nineteenth century. Prerequisites, 352 and permission.

#### ARCH

#### 452 Characteristics of Puget Sound Architecture and Towns (3) Sp Steinbrueck

Form, detail, and construction as determining and identifying qualities of buildings. Esthetic and historical values as seen in the visual qualities of the urban form of the Puget Sound town. Prerequisites, 352 and permission.

#### ARCH

#### 453 Architecture of the Ancient World (3) W Bosworth

Study and critical analysis of major architectural achievements of ancient Greece and Rome, Prerequisites, 352 and permission. (Offered alternate years.)

#### ARCH

454 Romanesque and Gothic Architecture (3) Sp

Hildebrand

Architecture of Western Europe from the decline of the Roman Empire through the fifteenth century. Prerequisite, 352 or permission. (Offered alternate years.)

#### ARCH

## 455 Renaissance and Baroque Architecture (3) Sp

Pundt

Study and critical analysis of European architecture and urban design from circa 1450 to 1750. Prerequisites, 352 and permission. (Offered alternate years.)

#### ARCH

### 456 History of Chicago School Architecture (3) WS

Pundt Study and critical investigation of the contribution of major architects in Chicago, the Midwest, and the West Coast from circa 1870 to 1920. Prerequisite, permission.

#### ARCH

#### 457 Neoclassicism and Romanticism in Europe and America (3) Sp Pundt

Study and critical investigation of European and American architecture and urban design from 1750 to 1850. Prerequisites, 451 and permission. (Offered alternate years.)

#### ARCH

#### 458 South Asian Architecture (3) W Curtis

Introduction to South Asian architecture, its generating forces, parameters, and con-sequent environments. Prerequisite, HSTAS 201 or permission. (Offered alternate years.)

#### ARCH

459 American Utilitarian Architecture (3) Sp Examination of significant American envi-ronmental 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, Seligmann Problematical nature of philosophies of architecture; interaction of philosophical concepts and architectural form and expression. Fundamentals of architectural criticism. Prerequisite, 352 or permission.

#### ARCH

# 470 Production Management I (2) Sp

Investigation and evaluation of office\_pro-duction 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 Carroll

Lectures and drafting-room practice.

#### ARCH

#### 495 Architectural Studies Abroad (9) Sp Zarina

Studies conducted under faculty supervision in various locations outside the United States. Student may be registered concurrently in an appropriate studio section. Prerequisite, permission.

#### ARCH

498 Special Projects (1-6, max. 6) AWSpS Instructor-initiated and department-approved systematic study and offering of specialized subject matter. Topics vary and are announced in preceding quarter. Prerequisite, permission.

#### ARCH

#### 499 Undergraduate Research (1-6, max. 6)

AWSpS Prerequisite, permission.

# **Courses for Graduates Only**

#### ARCH

500, 501 Architectural Design Laboratory (6,6) AWSpS,AWSpS

Theories and processes in architectural design, with emphasis on development of professional skills in design synthesis. Prerequisite, permission.

#### ARCH

# 502, 503, 504, 505 Architectural Studies Options (6,6,6,6) AWSpS,AWSpS,

AWSpS,AWSpS A group of advanced architectural studies design and sequences in general architectural synthesis, in special projects examining particular architectural determinants in detail, and in architectural research. Prerequisite, permission:

#### ARCH 513

**Design Communication I (3) AWSp** Rohrer

Historical and contemporary survey of design illustration and work in application to current design solution explanation. Prerequisite, permission.

#### ARCH

#### 514, 515 Design Communication II, III (3,3) 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, 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

Albrech

Theory of models, dimensional analysis, direct model analysis; studies employing specific materials, techniques of testing and measurement. Offered jointly with the Department of Civil Engineering as CESM 477. Prerequisite, 422 or permission.

#### ARCH

#### 522 Skin-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. (Last time offered: Spring Quarter 1975.)

## ARCH

#### 530, 531, 532 Graduate Studies in the Science of the Built Environment (3,3,3) A,W,Sp

MacGowan Graduate studies in microclimatic controls in the built environment, including individual opportunities for investigation in depth of lighting, acoustic and thermal conditions, as well as other related research interests. Prerequisites, 430, 431, 432, or permission.

# ARCH

# 535 Illumination Seminar (2) Sp

Principles and methods of natural and artificial lighting.

ARCH 536 Acoustics Seminar (2) 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

Seligmann Recent developments in architectural theory,

urban design theory, criticism, and the methodology of criticism. Prerequisites, 352, 460, or equivalent, and permission.

#### ARCH

#### 570 Production Management II (3) Sp

#### ARCH

571 Building Economics (3) A

Mithun

Social, political, and economic factors affecting the location, construction, financing, and marketing of buildings.

# ARCH

#### 572 Specifications and Contracts (3) W Mithun

Detailed organization and composition of contracts, specifications, and related contract documents.

#### ARCH

#### 573 **Professional Practice (3) Sp**

Mithun

Operation of an architectural office and professional practice.

#### ARCH

#### 575 Graduate Seminar, Research and

Analysis (3) WSpS

Bonsteel, R. Schneider

Survey of concepts and methods used in research and analysis, with particular emphasis on research in architecture and related disciplines; includes a review of extant works of significance to design decision making. Prerequisite, permission.

# ARCH

#### 578 Computer Applications in Architecture (3) A

Bonsteel

Studies of feasibility and the application of computer programs and automated systems for the building design process.

#### ARCH

#### **Graduate Seminar on Education** 590 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 preceptions 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

ARCHITECTURE AND URBAN PLANNING

# 592 Graduate Seminar on School Site Problems (3) Sp

R. Schneider

Small-group discussion of factors affecting location, use, and development of the school site, and problems associated with inappropriate procedures undertaken and their consequences. Offered on credit/no credit basis only.

#### ARCH

#### 594 Health Facilities Planning (3) Bennett, Bonsteel

Examination of the organization and execution of the total planning process for health care facilities, with individual parallel studies in selected topics.

#### ARCH

#### 596 Field Work in Professional Practice (9) Varey

On-location study under the supervision of a practicing professional involved in an aspect of environmental design. Approval of Professional Studies Committee required in the preceding quarter. Prerequisite, permission.

#### ARCH

#### **Special Topics for Graduate Students** 598 (1-6) AWSpS

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

#### Terminal Project for Professional 599 Degree (1-9) AWSpS

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 (1-6) AWSpS

In addition to other studies, a student may elect to conduct, individually or cooperatively with a fellow student or faculty member, a special research project. The objective of this research should be to investigate certain areas of either basic or applied research. May be repeated for credit. Prerequisite, permission.

#### ARCH

700 Master's Thesis (1-9) AWSpS

# **BUILDING CONSTRUCTION**

# **Courses for Undergraduates**

#### **BCON**

301, 302 Building Industry (3,3) A,W Eberharter

Organization and functioning of the building industry, legal, ethical, business, and management aspects.

#### **BCON**

#### 303 **Construction Safety (2) Sp** Short

Explanation of the requirements of the Occupational Safety and Health Act and other related federal and state legislation, as ap-

# ARCHITECTURE AND URBAN PLANNING

plied to the building construction industry. Standards for accident prevention and responsibility for compliance are emphasized.

#### **B**CON

# 310 History of Building (3) Sp

Historical survey of building techniques and materials as conditioned by environmental, technical, and social influences.

#### **BCON**

#### 330 Building Methods and Materials I (2) A

Introduction to building materials and methods, with detailed emphasis on the properties, the products, and the uses of building materials.

#### **BCON**

. 331 Building Methods and Materials II (2) W Introduction to building methods and materials, with emphasis on methods of assembly of buildings in detailed analysis. Prerequisite, 330.

#### **BCON**

#### 332 Building Methods and Materials III (2) Sp

Introduction to building methods and materials with emphasis on the assembly and finish of multistory commercial and institutional buildings. Prerequisite, 331.

#### **BCON**

401, 402 Building Estimating (4,4) A,W The principles of building costs, estimating, and construction cost control. Prerequisite, 332.

#### **BCON**

#### 410 Senior Study (4) AWSpS

Independent study of a specific building in-dustry problem with assigned proctor. Prerequisite, senior standing.

#### **BCON**

420 Building Financing (3) Sp Flaherty

The financing of building construction, financial institutions, regulations, government participation, and financing principles.

#### **BCON**

#### Undergraduate Research (\*, max. 12) 499 AWSpS

Individual or small-group studies in which students may select topics with approval of faculty sponsor and department. Prerequisite, permission.

# LANDSCAPE ARCHITECTURE

#### **Courses for Undergraduates**

## L ARC

301 Site Planning (6) A Haag, Streatfield

Introduction to site planning and landscape design, covering the factors of site analysis and planning, resource utilization, site suitability related to specific programs and activities; and planning, design, construction, and behavioral studies for selected case study projects.

#### LARC

#### 302 Landscape Design Studio (6) W Buchanan, Sakuma

Urban design through landscape architecture. Design of public use areas in the urban area. Project types for this course are waterfront development, commercial areas, campus and cultural centers, plazas and historical sites; recommendation for policy to be established as part of the design solution.

#### L ARC

#### 303 Urban Recreational Design (3) Sp Haag

Past, present, and future concepts of recreation design and theory, with an examination of the role of various governmental agencies and professional groups in the field of recreation. Special studies in metropolitan, urban, and neighborhood recreation areas; the design, policies, and behavioral studies of existing parks, playgrounds, public places, and commercial recreation areas. Design projects dealing with the play environment for all ages.

### LARC

# 320 Site Planning (4) S

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.

#### LARC

331 Landscape Construction (4) A Sakuma, 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 Haag

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

Streatfield

Introduction to site planning and landscape design, covering the factors of site analysis and planning, resource utilization, site suitability related to specific programs and activities; and planning, design, construction, and behavioral studies for selected case study projects. Open to nonmajors. (Formerly a section of 301.)

#### L ARC

#### 352 History of Landscape Architecture (3) W Johnston

Critical and historical analysis of man's progress in designing land and outdoor space.

#### L ARC

#### Theory and Perception of Landscape 361 Architecture (3) A Haag

Reciprocal relationships of man/nature are explored, with particular attention given to the cultural variations and interpretations of esthetics, 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, Sakuma

Scenic roads and lineal 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 Streatfield, 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 Streatfield, 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 inintervention. 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 Streatfield

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 resources; their identification, classification, visual assessment, and interpretation for design planning, program development, and policy decisions. Metropolitan to regional scale.

#### LARC

#### 406 Landscape Design Studio (6) Sp

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 Chittock

Delineation techniques and office presentation methods for landscape perspectives, sections, rendering of plant materials. Stresses plant



identification and associations generally used in landscape architecture. Discussion of historical and contemporary examples of landscape drawing.

# L ARC

#### 412 Landscape Graphics (2) W Haag

Office presentation techniques for various phases of landscape architectural projects. Multimedia techniques and presentation methods suitable for public hearings, citizen groups, design commissions, and private clients. Individual projects and case-study examples.

#### L ARC

#### 421 Landscape Horticulture (3) W Chittock

Basic horticultural principles with special attention given to the problems encountered in urban situations. Course deals with design implications and the effect of environmental influences, such as wind, sun, heat, precipitation, and soil, on plant growth; maintenance and related cost factors. Prerequisite, experience in plant sciences or Botany 331.

# L ARC

#### 422 Plants and Their Design Characteristics (3) W

Untermann

Utilization of plants in the urban areas and as major elements of project design. Technical considerations for selection, climate, and cultural suitability; maintenance, costs, and availability. History and theory of composition and abstract design qualities of plants.

#### L ARC 423 Planting Design (5) Sp

Miller

Utilization of plants in the urban areas and as major elements of project design. Technical considerations for selection, climate, and cultural suitability; maintenance, costs, and availability. History and theory of composition and abstract design qualities of plants. Open to nonmajors. (Formerly 422.)

# LARC 1

#### 433 Large-Scale Site Construction (4) Sp Mauck

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. (Formerly 333.)

#### L ARC

#### 462 Site Planning for Housing (3) W. Untermann

Large-scale site planning concerned primarily with housing as it relates to physical environmental conditions. Lectures cover methods for understanding and manipulating the land and the house, plus insights into other issues relevant to the site-planning process. Open to landscape architects, architects, planners, engineers, and business administration students interested in methods, procedures, rationale, and decisionmaking techniques in the physical planning of residential projects. Emphasis on high-density, low-rise housing.

#### L ARC

#### 463 Natural Processes as Planning and Design Determinants (3) W Streatfield

Introductory lecture course relating methods, procedures, and rationale for use of natural

#### L ARC

# 470 Landscape Architecture Tutorial (2, max. 6)

Tutorial course concerned with various aspects of project organization, programming, scheduling of work leads, graphic and verbal communication problems, data collection methods and interpretation, methodologies for landscape planting and design. Prerequisites, fourthor fifth-year standing and one quarter advance permission.

# LARC

#### 473 Office Procedure (3) Sp 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

# 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) AWSp

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. (Formerly 310.)

#### 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. Prerequisite, 340.

#### **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. (Formerly 490.)

#### **URB P**

#### 410 Theory and Philosophy of Planning (3) A Norton

An attempt to reveal "planning theory" as a synthesis or integration of concepts of societal structure (sociology), with concepts of environmental structure (cosmology), and with the social decision processes by which a society may alter both itself and its environment. Restricted to urban planning seniors. (Formerly 470.)

#### **URB** P

#### 411 The Urban Planning Process (4) W Miller

The urban plan and plan making. Emphasis on comprehensive, coordinative urban planning. Various planning surveys and methodology and techniques discussed. Prerequisite, 400. (Formerly 480.)

#### URB P

#### 412 Forecasting Methods in Urban Planning (3) Sp

J. B. Schneider

Examination of several forecasting methods, including trend extrapolation, Delphi, relevance trees, morphological boxes, crossimpact matrices, scenario generation, and literature monitoring techniques. Past failures and successes. Applications to urban planning problems. (Formerly 440.)

#### URB P

#### 420 Quantitative Methods in Urban Planning (3) ASp

Bell Methods of statistical analysis applied to urban planning; measurement and inference. Central tendency, correlation, trends, probability, surveys. (Formerly 430.)

#### **URB P**

# 421 Quantitative Analytical Models and Methods (3) WSp

Bell

Survey of probabilistic and mathematical models and other techniques of operations research relevant to planning. Emphasis placed upon linear and dynamic programming; critical path methods, queuing models, networks and the Bayesian approach to decision making under uncertainty. Stress placed upon the underlying model and implications for planning rather than on mathematical detail. Prerequisite, 420 or permission. (Formerly 431.)

#### **URB** P

#### 429 On-line Planning of Urban Systems (3) W

J. B. Schneider

Survey of on-line planning applications; use of various on-line systems to solve urban systems design problems; investigation of hard-

# ARCHITECTURE AND URBAN PLANNING

# ARCHITECTURE AND URBAN PLANNING

ware/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)

#### Horwood

Identification of the framework, central concepts, constraints, and issues of the urban transportation planning problem. Offered jointly with the Department of Civil Engineering as CETC 425. (Formerly 425.)

#### **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 by the Division of Community Development. 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. (Formerly 474.)

#### **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. (Formerly 475.)

#### **URB**P

#### 449 Planning Problems of the Black Community (3) W Carter

Course objective is to enable study to acquire an understanding of the complexity of factors operating in urban communities that give rise to and sustain the inner-city ghetto and how planning has been related to these problems in both their creation and solution. (Formerly 473.)

#### **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. (Formerly 482.)

#### **URB P**

451 Housing (3) AWSp Grey, Ludwig

Survey of housing and redevelopment problems, theories, standards, and practice. Development of public policies, finance, technological considerations, social factors, and priori-ties. Prerequisite, 400. (Formerly 485.)

#### 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. (Formerly 494.)

#### **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 the Department of Geography as Geography 466. (Formerly 451.)

#### **URB P**

#### 470 Introduction to Urban Design (3) Prasanna

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. Prerequisites, Architecture 300, 310, and 201, 311, or three quarters of basic design. (Formerly 423.)

#### **URB** P

#### 477 Social Functions of Environmental Form: A Behavioral Basis for Urban Design/ Physical Planning (3) A

Organization and character of the environment as significant variables in social processes basic to effective functioning, with special emphasis on the implications of urban design.

#### URB P

#### 478 Psychological Functions of **Environmental Form: A Behavioral Basis for Urban Design/Physical** Planning (3) Sp ,

Organization and character of the physical environment as significant variables in psychological processes basic to effective in-dividual functioning, with special emphasis on the implications for urban design/physical planning.

#### URRP

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) ASp Lamare

Conceptual problems in metropolitan analysis; urban governmental systems; regional political decision-making structures; metropolitan, state, and federal relations; value im-plications of formal organization. Offered jointly with the Department of Political Science as Political Science 480. (Formerly 460.)

#### **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**

#### TRBP

#### 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 procedúres used by planners. Critical appraisal. Not open for credit to students who have taken 400.

#### URBP

#### 501 Resources for Urban Planning (2) A

Introduction to areas of specialized study in environmental planning and policy program-ming. 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. (Formerly 522.)

#### **URB P**

#### 506 General Urban Planning (2) Sp

Calkins, Grey, Horwood, Norton Calkins, Grey, Horwood, Norion Introduction to applied professional planning. Consideration of analysis, programming, and implementation methods in preparation for General Urban Planning Laboratory. Prereq-uisites, 500 and 501. (Formerly 521.)

#### URB P

#### 507 General Urban Planning Laboratory (5) Sp

Calkins, Gray, Horwood, Norton

Laboratory exercise in applied professional planning, utilizing a local study area to examine the realities of problem solving in situations of functional and normative conflict. Integration of analysis, programming, implementation, and presentation phases of the planning process. Prerequisite, 506. (Formerly 541.)

#### **URBP**

508 Specialized Planning Laboratory (5) A Several different sections or options are to be offered each year, such as regional-environ-

#### URBP

#### 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. Prerequisites, 500 and 501. (Formerly 580.)

#### **URBP**

#### 511 Theories and Methodologies of Planning II (4) Sp Miller

Factors relating to the timing, phasing, and programming of urban development. The bearing of amenity, density, etc., on the actual development process. Prerequisite, 510. (Formerly 581.)

## **URB** P

512 Research Seminar (2) A Development and presentation of advanced topics of individual investigation. (Formerly

# 550.) URB P

#### 527 Information Systems for Planning and Research (3) A

Horwood, Staff Computer programming technology and data systems design for large-scale data inputs. Machine editing, data manipulation, and information retrieval. Laboratory problems adapted to specialized interests of students. No previous computer programming experience required. Offered jointly with the Department of Geography as Geography 527 and the Department of Civil Engineering as CETC 527.

#### **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 the Department of Geography as Geography 528 and the Department of Civil Engineering as CETC 528. Prerequisites, basic statistics and 527, or permission.

# URB P

#### 529 Computer Applications to Urban and Regional Analysis (3) Sp Horwood, Staff

Simulation models and automated systems for the study of land use and related economic and demographic data. Machine methods of planning analysis and feedback review. Laboratory projects. Offered jointly with the Department of Geography as Geography 529 and the Department of Civil Engineering as CETC 529. Prerequisite, 528 or permission.

#### **URB**P

#### 530 Transportation and Land Use Planning Models (3) A

J. B. Schneider

Theory underlying land use and transportation planning models. Past attempts to model urban development. Modeling of alternatives. Forecasting technological innovations, assessing their land use implications. Offered jointly with the Department of Civil Engineering as CETC 525. Prerequisite, permission. (Formerly 525.)

#### 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 the Department of Civil Engineering as CETC 535. (Formerly 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. (Formerly 575.)

#### **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 is ordinarily arranged by the Division of Community Development. Prerequisite, permission.

#### URB P

#### 550 Benefit-Cost Analysis Applied to Urban Development

Seyfried

Practical application of benefit-cost methodology to the decision-making process for urban development. In a "workshop" format, benefitcost analysis procedures are applied to urban development projects or programs, including urban renewal as defined by legislation. Theory or methodology is utilized as necessary to determine objectives, to identify and to measure benefits and costs, and to specify decision criteria in terms of the public interest. (Formerly 505.)

#### **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. (Formerly 512.)

# URB P

#### 565 Comparative Urbanism (3) Sp Wolfe

Characteristics and problems of urbanization in the world; comparisons of origins and development; physical form, land utilization, and planning. Selected major cities. Prerequisite, permission. (Formerly 579.)

#### **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 the Department of Geography as Geography 566. Prerequisite, 466 or Geography 466. (Formerly 551.)

#### **URB** P

#### 567 Research Seminar: Geography and Development (3, max. 6) A Thomas

Offered jointly with the Department of Geography as Geography 567. (Formerly 530.)

#### **URB**P

#### 570 Urban Design Process (2) W Wolfe

The study of concepts, methods, and processes basic to planning, design, and effectuation. Prerequisite, 479. (Formerly 523.)

#### **URB P**

# 571 Research and Analytical Methods for Urban Design (3) W

Wolfe

Studies of the various arrangements of urban forms that affect perceptual experiences. Urban design considerations of the location of structures, open space, movement channels, and methods of implementing public policy decisions affecting urban design. Prerequisites, 400, 479 or academic design background, or permission. (Formerly 524.)

#### **URB**P

#### 572 Graphic Communication in Urban Planning (3) W

Prasanna

Intended to introduce the nondesign student to the use of graphics and other representational techniques as a means of conceptualizing and expressing ideas, and for recording, analyzing, and controlling the environment. The course covers the use of drawing, three-dimensional models, mapping, diagrams, report layout, photography, exhibit preparation, etc., as tools for the effective communication of ideas. (Formerly 502.)

#### **URB** P

# 573 Laboratory in Urban Design (5) W

Development of urban design within the context of the total planning process. Specifically, the following areas are emphasized: investigation, development, and application of survey techniques, analyses, programming, concepts and methods of implementation relative to urban design. Prerequisite, 570 or permismission. (Formerly 543.)

#### **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. (Formerly 504.)

#### **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

URBP 700 Master's Thesis (\*) AWSpS

URB P 800 Doctoral Dissertation (\*) AWSpS

# COLLEGE OF ARTS AND SCIENCES

# ANTHROPOLOGY

### **Courses for Undergraduates**

#### GENERAL

ANTH 100 Introduction to the Study of Man (5) Introduction to the subfields of archaeology, physical anthropology, and sociocultural anthropology through the examination of selected problems in human physical, cultural, and social evolution. Not open for credit to students who have had or are currently taking other courses in anthropology, archaeology, or physical anthropology.

#### SOCIOCULTURAL ANTHROPOLOGY

#### ANTH

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 lan-guage 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 anthro-pology courses. May be taken by students who have had archaeology or physical anthropology courses. Prerequisite, sophomore standing.

#### ANTH

#### 311 Indian Cultures of the Pacific Northwest (3)

Comparative analyses of the social and po-litical institutions and belief systems of the native peoples of the Pacific Northwest, including plateau peoples. Emphasis centers on contemporary life styles. Prerequisite, 100 or 202.

#### ANTH

316 South Asia (3)

Major cultural features of the Indian and Pakistan subcontinent. Prerequisite, sophomore standing.

#### ANTH

317 Southeast Asia (3)

Survey of the culture, history, and contemporary ethnology of the peoples of southeast Asian countries: Burma, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, and the Philippines. Prerequisite, sophomore standing or permission.

#### ANTH

# 322 Peoples of South America (3)

Contemporary societies of South America: economic, political, ethnic, and cultural charac-teristics; 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 the School of Art as ART H 333. Prerequisite, sophomore standing.

#### ANTH

# 334 Art of the Northwest Coast Indian (3) Three-dimensional art of the Northwest coast cultural art with emphasis on esthetic principles, techniques, and cultural functions. Offered jointly with the School of Art as 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 the School of Art as 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

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 chinasocietal, political, economic, and religious-are analyzed in light of contemporary social science theory. Attention is also given to modernizing change. 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 tradi-tional and contemporary periods. Prerequisites, 202, and either 216 or permission.

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#### 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 adop-tion. 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 con-



tact. Ethnographic comparisons of local organization and land tenure, kinship, law, and religion. Past and present use of aboriginal data in social science theory. Prerequisites, 202, and either 216 or permission.

#### ANTH

#### 412 South Asian Social Structure (5)

Caste dynamics, political control, economic organization, and religion in Hindu-village India. Prerequisite, 202 or permission.

#### ANTH

#### 416 North American Indians (3)

Descriptive and comparative study of the aboriginal cultures of North America, with attention also to present-day conditions. 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. (Formerly 319.)

## 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

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, ex-amined anthropologically and in relation to student interests. Critical examination of relevant theories and methods of analysis. Prerequisite, 100 or 202.

#### ANTH

#### 432 Visual Anthropology (3)

The place of photography and films in ethnography; their use in the documentation and interpretation of cultural and social systems. Prerequisite, 202 or permission.

#### ANTH

#### 434 Comparative Morals and Value Systems (3)

Sociological functions of morality in simple societies. Prerequisite, 202 or permission.

#### ANTH

#### 435 Primitive and Peasant Economic Systems (5)

Chief features of nonmonetary and simple monetary economies. The impact of monetary economy and industrial technology on preindustrial systems and those of limited monetary circulation. Prerequisite, 202 or permission.

#### ANTH

437 Political Anthropology (5)

Survey of the major approaches and theories. Prerequisite, 202 or permission.

ANTH 438 The Analysis of Kinship Systems (5) Kinship groups in evolutionary perspective; functional analyses of kin roles; structural analyses of kin statuses; the analysis of sets of kinship terminology; the culture of kinship. Prerequisite, 202 or permission.

#### ANTH

# 439 Anthropology of Law (5)

Juridical activities in preliterate societies. Relation of law to religion, politics, and social structure. Prerequisite, 202 or permission.

#### ANTH

440 Child-Rearing, Culture, and Health (3) Cross-cultural study of the child-rearing practices, the cultural norms, and the health behavior of children and adolescents in different societies. Comparative approaches, diverse theoretical postures, and empirical research findings are used to study socialization practices and their relationship to cultural, social, and health systems of selected cultures. No prerequisites; however, it is recommended that a registrant has taken courses in child development, introductory anthropology, and psychological anthropology. Offered jointly with the School of Nursing as Nursing 495.

#### ANTH

441 Introduction to Culture and Personality (5)

Systematic survey of the field of culture and personality as a subdiscipline of social anthropology. The relevance of psychological variables for the study of social systems and culture. Prerequisites, 202 and any introductory course in general psychology or personality theory, or permission.

# ANTH

#### Anthropological Aspects of 442

Communication (5)

Introduction to communicational aspects of culture. Prerequisite, 202.

# ANTH

#### 445 Quantitative Methods in Anthropology (3)

**Ouantitative** methods and inferential statistics intended for students in anthropology. Prerequisites, ANTH 202, ARCHY 205 or PHY A 201, and Mathematics 281, or permission.

#### ANTH

450 Introduction to Language (5) The science of language surveyed with the emphases and orientations of anthropological linguistics. Prerequisite, 202 or permission.

#### ANTH

451, 452, 453 Phonology (3,3,3)

Detailed study of speech sounds, mechanism of their production, and structuring of sounds in languages; practical experience with a wide variety of languages; field techniques. Offered jointly with the Department of Linguistics as Linguistics 451, 452, 453. Prerequisite, Linguistics 200 or 400, which may be taken concurrently, or permission.

#### ANTH

455 Areal Linguistics (3, max. 6) Linguistics analyses of the languages of a selected area. Offered jointly with the Department of Linguistics as Linguistics 455.

# ARTS AND SCIENCES

# ANTH

# 456, 457, 458 Basic Swahili (5,5,5)

Introduction to the structure of spoken and written Swahili. Concentration on the acquisition of elemental conversational skill and an introduction to written texts of graded difficulty. Prerequisites, 456 for 457; 457 for 458.

#### 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)

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 the Department of Linguistics as Linguistics 461. 462, 463. Prerequisite, Linguistics 200 or 400 or permission.

#### ANTH

# 466, 467, 468 Intermediate Swahili (3,3,3)

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, 456, 457, 458 or equivalent for 466; 466 for 467; 467 for 468.

#### 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

#### 486, 487, 488 Practicum in African Languages (3,3,3) A,W,Sp Eastman

Introduction to specific African languages with an emphasis on teaching skills that can be acquired in a language laboratory setting. One language is taught each 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, 486 for 487; 487 for 488.

#### 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, orga-

# ARTS AND SCIENCES

nization, 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 es-thetic expression, such as graphic arts, oral literature, dance, and humor among non-Western peoples. Prerequisites, 202, 429, 450 (or 453), and permission.

#### ANTH

495 Advanced Problems in Ethnology (3) One or more current problems in ethnology. Seminar format. Prerequisites, 25 credits in anthropology and permission.

# ANTH

#### 496 Problems in Psychological Anthropology (3)

Problem areas and new approaches to the study of culture and personality. Prerequisites, 441, 20 additional credits in anthropology, and permission.

#### ANTH

499, 499H Undergraduate Research (\*, max. 12; max. 18 for honors students only) Prerequisite, permission.

#### ARCHAEOLOGY

#### ARCHY

#### 205 Principles of Archaeology (5)

Introduction to the aims of archaeology and methods of reconstructing prehistory. Signifi-cance of various methods of food collection and food production, of domestication of plants and animals, and of agricultural systems. Techniques of dating archaeological remains.

#### ARCHY

270 Field Course in Archaeology (12) Methods and techniques of field excavation as demonstrated through field experience. Prerequisite, permission, (Offered Summer Quarter only.)

#### ARCHY

303 Prehistoric Cultures of the Old World (3) Beginnings of culture in the Old World to the Early Iron Age in Western Europe. Prerequisite, sophomore standing.

# ARCHY

#### 304 Prehistoric Cultures of the New World ' (3)

Beginnings of culture of the New World from Pleistocene times until European exploration and conquest. Prerequisite, sophomore standing.

# ARCHY

#### 370 Methods and Problems of Archaeology (5)

Field experience in the Pacific Northwest. Prerequisite, permission.

### ARCHY

371 Analysis of Archaeological Data (3) Designed for students who have had field experience in archaeology. Prerequisite, permission.

#### ARCHY

#### 469 Special Studies in Archaeology (3, max. 6)

Consideration in detail of specific archaeological topics, either methodological or substantive in content, that are of current interest. Offered

occasionally by resident, new, or visiting faculty. For advanced undergraduates and graduate students. Prerequisites, 205 and permission.

#### ARCHY

**Trans-Pacific Contacts in Pre-Columbian** 471 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 millenium before Christ. Prerequisites, 304 and permission.

# ARCHY

#### 473 Prehistoric Cultures of Mexico (5)

Pre-Hispanic culture history of Middle American civilizations in central and southern Mexico and the desert dwellers in northern Mexico. Prerequisite, 304 or permission.

#### ARCHY

474 Prehistoric Cultures of South America (3) Archaeological history of the Andean region from the beginnings of agriculture to the culmination of Incan civilization and related civilizations in Colombia, Ecuador, Peru, Bolivia, Chile, and Argentina. Archaeological history of some tropical and subtropical regions of South America. Prerequisites, 304 and permission.

#### ARCHY

#### 475 Archaeology of the Mayan Civilization (3)

Pre-Hispanic culture history of the Mayan peoples of Guatemala, the Yucatan peninsula, Honduras, and Chiapas (Mexico). Prerequisites, 304 and permission.

#### ARCHY

#### Middle America Prehistory: Semipar 476 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, Guerro, Puebla, Veracruz, Oaxaca, and Jalisco. Knowledge of Spanish recommended. Prerequisites, 304 and permission.

#### ARCHY

#### Middle America Prehistory: Seminar 477 Tour II (7) S

Seminar-tour of major archaeological sites and museums in Middle America. The course is designed to follow ARCHY 475, Archaeology of the Mayan Civilization, and includes visits to the federal district of Mexico, Veracruz, Tabasco, Chiapas, Campeche, Yucatan, Quintana Roo. The Peten, and Highland Guatemala. Knowledge of Spanish recommended. Prerequisites, 304 and permission.

#### ARCHY

#### 492 **Prehistoric and Ethnographic** Populations (3)

Detailed examination of relationship between man and his environment, present and prehistoric. Primary emphasis on nature and size of population in relation to food and other resources over the last three million to four million years. Use of ethnographic data and the study of various historical approaches to this problem. Prerequisites, 205, ANTH 445 or Mathematics 281 or Quantitative Science 281 or Sociology 223, and permission. (Offered alternate years; offered 1974-75.)

#### ARCHY

#### Archaeological Theory and Method I, Formal Theory (3) 497

Examination of theoretical constructs in the analysis of archaeological data. Terminology, typologies, and interregional comparisons. Pre-requisites, 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 recon-struction, and explanatory prehistory, considering the nature of explanation as conceived in these areas, the basic assumptions employed in achieving these aims, and an introduction to the methods employed. Prerequisites, 205 and 497.

#### ARCHY

# 499, 499H Undergraduate Research

# (\*, max. 12; max. 18 for honors students) Prerequisite, permission.

#### PHYSICAL ANTHROPOLOGY

#### PHY A

201 Principles of Physical Anthropology (5) The evidence for primate evolution from the fossil record and from the morphological, genetic, and behavioral variability of living forms. Relationship of human genetics to the evolution of modern populations.

#### PHY A

#### 281 African Origins: Social Biology of Sub-Saharan Africa (3)

Origin and biological nature of the peoples of Africa south of the Sahara with emphasis upon the influences of ecology, disease, and nutrition. Race mixtures, growth and development, physique, heat stress physiology, and genetics. Prerequisite, sophomore standing. (Offered Summer Quarter only.)

# PHY A

#### 282 Afro-Americans: Social Biology of Blacks in the New World (3)

African source areas, distribution, and biology of Negroes in the Americas with special emphasis on the United States. Race mixture, racial laws, and Negro reactions. Racial composition, growth patterns, body build, climatic stresses, and disease susceptibilities. Prerequisite, sophomore standing. (Offered Summer Quarter only.)

# PHY A 284 Social Biology of the North American Indian (3)

Peopling of the aboriginal New World, its population at time of discovery, and subsequent changes. Past histories as seen through skeletal remains and analysis of morphological and genetic variation in living North American In-dians. Race mixture. Effects of cultural, dietary, and disease factors in their physical and clinical status. Prerequisite, sophomore standing.

# PHY A 285 Social Biology of Middle and South American Indians (3)

Synthesis of archaeological, historical, cultural, and biological data in delineating the clusters of extant populations of living Indians. Intensive review of nutritional and clinical studies in Guatemalan and Peruvian Indians. Current genetic data on largely intact Indian populations. Prerequisite, 284 or permission.





#### рну / **Ecology and Biological Adaptation in**

Man (5) Man's biological legacy and present adaptability viewed from various aspects of human ecology: the cultural past, climate and geography, nutrition and disease, and pollutants and contaminants. Oriented in terms of natural and cultural selection of those who are to live to reproduce and those who are not, and of the physical and mental damage resulting from ecological factors. Prerequisites, 201 or Biology 101-102 or 210.

# PHY A

#### 388 Evolution and Ecology of Early Man and Other Primates (5)

Nature of the evolutionary process as applied to primate and human evolution. Discussion of geological and ecological background and of pertinent dating methods. Relevance of behavioral, cytogenetic, and biochemical data to morphological distance in primate systematics. Man, ecology, and culture in the Pleistocene and recent periods. Prerequisite, 201.

#### PHY A

470 Introduction to the Primates (3)

In-depth examination of the origin and the distribution of primates in time and space: growth and development, posture and locomotion, sexual and intraspecific differences, special sense organs, oral cavity, skin and hair, behavior, and major evolutionary trends. Prerequisite, 201.

## PHY A

#### 480-481 Primate Anatomy: Structure and Function (5-5)

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, Genetics 351 or 451 and statistics.

#### PHY A

### 483 Primate and Human Variations (5)

Discussion of the morphological, physiological, and genetic variability of living primate and human populations with special reference to adaptation. Stressed are adaptive responses to selective pressures engendered by the total environment. Laboratory. Prerequisites, Genetics 351 or 451 and statistics, or permission.

#### PHY A

# 484 Primate and Human Growth (3)

Genetics of growth and maturation in experimental primates and man. Emphasis is the effect of the total environment upon growth processes with special reference to non-Western human societies. Prerequisite, statistics or permission.

#### PHY A

#### 485 Primate and Human Growth Laboratory (2)

Laboratory dealing with current methods used to assess growth and development. Must be accompanied by 484. Prerequisite, statistics or permission.

# PHY A

486 Primate and Human Evolution (5) Discussion of living forms and the fossil record with reference to the nature of primate evolution. Morphological, genetic, and behavioral data are used to appraise taxonomy of living primates and their phylogenetic implications. Special emphasis is placed on the evolution of the hominids and their cultures. Laboratory. Prerequisite, Geological Sciences 437, which may be taken concurrently, or permission.

#### PHY A

487 Human and Comparative Osteology (3) Introduction to the vertebrate skeleton. The skeleton is described in detail, and various methods of determining age and sex are presented, as well as osteometry and modern statistical methods for handling such data. Prerequisite, permission.

#### PHY À

498 Advanced Topics in Physical Anthropology (3, max. 9)

Series of seminars on different aspects of physical anthropology. Prerequisite, permission.

# **Courses for Graduates Only**

GENERAL

#### ANTH

Independent Study or Research (\*) 600 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.

# ARTS AND SCIENCES

#### ANTH

# 512 Seminar on Oceania (3)

An advanced comparative treatment of selected aspects of the cultures and societies of Oceania.

#### 513 Seminar on Africa (3, max. 9)

Advanced comparative treatment of selected aspects of the cultures and societies of Africa.

#### ANTH

#### 516 Seminar on Southeast Asia (3, max. 9) Advanced comparative treatment of selected aspects of the cultures and societies of Southeast Asia.

#### ANTH

517 Seminar on South Asia (3) Advanced analysis of selected problems in South Asian ethnology and social structure. Prerequisite, 412.

# ANTH 518 Seminar on Middle America (3)

Advanced comparative treatment of selected aspects of the cultures and societies of Middle America.

#### ANTH

525 Seminar in Culture Processes (3, max. 6) The concept of process and its application to the study of culture.

#### ANTH

# 527 Acculturation (3)

Systematic analysis of psychological, social, and cultural implications of the contact of peoples.

#### ANTH

# 529 Seminar in Expressive Culture (3)

Detailed study of selected topics in expres-sive culture from an anthropological point of view. Prerequisite, 429 or permission.

# ANTH

# 537 Non-Western Political Systems (3)

Ethnic manifestations, methodological problems, and theoretical implications of polity in a wide range of cultures.

#### ANTH

# 540 Anthropology and Health (3)

Seminar on the history, development, and future of anthropological contributions to problems of health and illness. Offered jointly with the Department of Epidemiology and Interna-tional Health as Epidemiology 540. Prerequisite, permission.

#### ANTH

#### 541 Seminar in Psychological Aspects of Culture (3)

Selected problems in the relation of culture and personality types. Prerequisite, 441 or permission.

#### ANTH

#### 550 Field Text Recording (3)

Training in verbatim recording in non-Western connected speech such as myth and biographical dictations; especially designed for sociocultural anthropologists, rather than linguists, who are shortly leaving for a long session of field research.

#### ANTH

#### 553 Analysis of Linguistic Structures (3, max. 6)

Offered jointly with the Department of Linguistics as Linguistics 553. Prerequisite, permission.
#### ANTH

559 Seminar in Language and Culture (3) Theoretical and methodological problems in language and culture.

#### ANTH

561 Seminar in Methods and Theories (3, max. 9)

#### ANTH

562 Implications of Concepts From

Anthropology for Nursing (3) Examination of selected core concepts from anthropology and an assessment of the implications of these concepts for nursing research. Offered jointly with the School of Nursing as Nursing 562.

#### ANTH

563 **Structural Functional Analysis** (3. max. 9)

#### ANTH

#### 564 Formal Methods of Analysis for Social Anthropology (3)

Seminar on selected nonstatistical mathematical methods and models of relevance to various problems in social anthropology.

#### ANTH

565, 566, 567 History of Anthropological Sciences (3.3.3)

Series of core courses for the beginning graduate student in which the growth and development of anthropological science is analyzed.

#### ANTH

#### 569 Social and Cultural Change: Africa (3, max. 9)

Urbanization, stratification, technology, education, social and religious movements, and cultural pluralism in contemporary Africa. Offered jointly with the Department of Sociology as Sociology 569. Prerequisite, graduate standing in a social science department.

#### ANTH

#### 570 Research Techniques in the

Anthropological Study of Kinship (3-9) Introduction to research methods in the study of kinship systems. Prerequisite, 438 or permission.

ANTH 571 Communicational Anthropology (3-9) Introduction to communicational aspects of culture. Prerequisite, permission.

#### ANTH

591 Seminar in Museology (3) Research into problems of museology. Prerequisite, permission.

#### ARCHAEOLOGY

#### ARCHY

501 Preceptorial Reading (6)

For beginning graduate students who have not had adequate training in the problems, principles, and methods involved in the reconstruction of prehistory.

#### ARCHY

570 Seminar in Theory and Method in Archaeology (3)

ARCHY 571 Field Course in Archaeology (5) Study of prehistoric cultures through archaeological excavation and analysis. Work is largely in the state of Washington, but other areas may be included. (Offered Summer Quarter only.)

#### ARCHY

572 Seminar in North American Archaeology (3, max. 6)

Selected problems in the archaeology of 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 tech-niques of wide applicability in the field situa-

ARCHY

#### 590 Advanced Archaeological Analysis (6)

tion. Prerequisite, permission.

Practical laboratory instruction in the prepa-ration of regional scale archaeological data for analysis, attribute recognition and analysis, stylistic and functional analysis, pattern recognition, and correlative analysis of edaphic, floral, and faunal data in a controlled laboratory case. Prerequisite, permission.

#### ARCHY

# 591 Advanced Field Course in Archaeology (9) W

Designed for intermediate-level graduate stu-dents who have had some field experience and other graduate courses in archaeology. Field experience in Mexico; other geographical lo-cations 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 training in the study of primate had adequate training in the study of primate principles, and methods involved in the study of evolution, human genetics, and the evolution of modern populations.

#### PHY A

#### 581 Dental Anthropology (5)

Intensive survey of the dentitions of primates from tree shrews to mah. Emphasis placed on the range of metric and morphologic variability existing in the teeth of these animals, both in fossil and living groups. Environmental and genetic factors are considered within this ontogenetic and phylogenetic framework.

# PHY A 582 Seminar in Populations and Genetics (3, max. 9)

Examination of various problems dealing with the forces of evolution operative on human populations. Prerequisite, 482 or permission.



# PHY A 583 Topics in Growth and Development (3, max. 9)

Seminar dealing with various topics of child growth and development. Topics change from quarter to quarter. Prerequisite, 484 or permission.

# PHY A 584 Topics in Ecology and Adaptation (3, max. 9)

Seminar dealing with various aspects of ecology and adaptation. Topics change from quarter to quarter. Prerequisite, 483 or permission.

# PHY A 586 Topics in Primate and Human Evolution (3, max. 9)

Consideration of one or more major topics relevant to the evolution of man and the primates. Prerequisite, permission.

#### ART

#### **Courses for Undergraduates**

#### HUM

#### The Arts of Africa, the 103

Caribbean, and Black America (5) Creative achievements by the Blacks of Africa, the Caribbean, and America in visual arts, music, dance, literature, and theatre. Guest lecturers and performing artists.

#### ART

#### 100 Introduction to Art (3) For majors in elementary education.

ART

#### 101 Special Studies in Art for Nonmajors (3, max. 9)

Individual and group instruction in art with special projects, readings, and papers in art serving as a focus for studio work. Prerequisite, permission.

#### ART

#### 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

Study Abroad: Nonmajor Individual 197 Projects (3-5, max. 10) Prerequisite, permission.

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.



# 205

Graphic Design (3)

Survey and introduction (design and use of letter forms). Prerequisites, 107, 110, 129.

ART 206 Graphic Design (3) Basic problems in visual design. Prerequisite, 205.

ART 207 Graphic Design—Project Design (3)

Structured to allow students to work with a designer on applied design projects for one quarter. Prerequisite, 206.

### ART

210 Art and the Individual (3) Studio-lecture survey of contemporary art forms and their significance as they relate to the individual. One of a three-quarter series required of all art education majors on the sophomore level to develop a core of knowledge appropriate to prospective teachers of art. Prerequisite, sophomore standing in art education.

#### ART

211 Art in the Schools (3) Studio-lecture survey of contemporary art forms and their significance as they relate to the schools. One of a three-quarter series required of all art education majors on the sophomore level to develop a core of knowledge appropriate to prospective teachers of art. Prerequisite, sophomore standing in art education.

# ART

# 212 Art in the Community (3)

Studio-lecture survey of contemporary art forms and their significance as they relate to the community. One of a three-quarter series required of all art education majors on the sophomore level to develop a core of knowledge appropriate to prospective teachers of art. Prerequisite, sophomore standing in art education.

## ART

220 Drawing and Painting (6, max. 18) Integrated approach to drawing and painting for three consecutive quarters with the same instructor. Prerequisites, 107, 110, 129, and permission.

# ART 250 Design and Materials: Textiles—Printing

Printing and dyeing of textiles. Techniques include block printing, batik, tie and dye, dis-charging. Prerequisites, 107, 110, 129.

#### ART

#### 251 Design and Materials: Glass (3)

Fusing, forming, laminating, and surface treat-ments of glass (glass-blowing excluded). Pre-requisites, 107, 110, 129.

# ART 252 Design and Materials: Plastics (3)

Forming, joining, and casting of plastics. Pre-requisites, 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)

Knotting, hooking, stitching, and other nonwoven constructional techniques. Prerequisites, 107, 110, 129.

ART 256 Painting (3) Beginning oil painting. Prerequisites, 107, 110, 129.

#### ART

257 Painting (3, max. 6) Oil painting, Prerequisite, 256.

ART 259 Water-Soluble Media (3, max. 9) Prerequisites, 107, 110, 129.

ART 261 Elements of Interior Design (3) Study of basic residential spaces and furnishings. Scale drawings, materials, and color.

ART 262 Essentials of Interior Design (2) Illustrated lectures on color, texture, and form in residential space. Prerequisite, interior design major status.

#### ART

265 Intermediate Drawing (3, max. 9) Prerequisites, 107, 110, 129.

ART 272 Beginning Sculpture Composition (3, max. 6)

Fundamentals of composition in the round and in relief. Prerequisites, 107, 110, 129.

ART 274 Life Sculpture (3, max. 9) Work in clay from the posed model. Figure composition, discussions, reading, and sketch book. Prerequisite, 6 credits from 272.

#### ART

300 Art Education: Crafts (3) General techniques and processes involved with various materials. Prerequisites, 107, 110, 129.

#### ART

301 Art Education: Crafts (3)

Design in leather. Exploration of techniques and processes leading to creative work. Prerequisites, 107, 110, 129.

ART 302 Art Education: Crafts (3) Bookbinding. The design and construction of books including decorative paper techniques. Prerequisites, 107, 110, 129.

ART 303 Art Education: Crafts (3) Paper techniques and processes. Prerequisites, 107, 110, 129.

ART 304 Art Education: Crafts (3) Textile techniques and processes. Prerequisites, 107, 110, 129.

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#### ART

307 Intermediate Painting (3, max. 6) Prerequisite, 6 credits from 257.

ART 309 Portrait Painting (3) Prerequisite, 6 credits from 307.

### 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 presen-tation. Prerequisites, 107, 110, 129, 262; Architecture 300, 301; Home Economics 125 for 310; 310 for 311; 311 for 312.

#### ART

313, 314 Fundamentals of Photography (3,3) Basic theory and techniques of photographic reproduction. Lighting, exposure, camera tech-nique, and processing. Application of photo-graphic techniques to the solution of problems in visual presentation. Prerequisites, junior standing in graphic or industrial design and permission for 313; 313 and permission for 314.

# 316, 317, 318 Design for Industry (5,5,5)

Product design, working drawings, models, presentation drawings, product analysis, dis-play, 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, and theory of drawing as an art form. Prerequisite, 9 credits from 265.

#### ART

### 328 The Film as Art (3)

Historical development of film as an esthetic medium with an emphasis on pivotal filmmakers and their unique contribution to the art of film.

#### ART

#### 332 Intermediate Sculpture Composition (5, max. 15)

Advanced work in various media and techniques. Prerequisite, 274.

#### ART

#### 335 Metal Casting (3, max. 6) Introduction to foundry techniques as applied to fine arts casting of nonferrous material. Prerequisite, 6 credits from 272.

# ART 337 Welding (3, max. 6)

Study and application of welding methods as a sculpture technique making use of oxy-acetelyne, electric arc, and heliarc. Prerequisite, 6 credits from 272.

#### ART

**339** Filmmaking (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.

Hand-block and silk-screen printing; mass-

#### ART 340 Design for Printed Fabrics (3)

production design. Prerequisite, 250 or permission.

#### ART

350 Introduction to Printmaking (3) Prerequisites, 107, 110, 129.

351 Printmaking (3, max. 6) Prerequisite, 350.

#### ART

353 Advanced Ceramic Art (5, max. 15) Advanced work in forming, decorating, and glazing. Prerequisite, 203.

ART 357 Metal Design (5)

Construction includes processes of raising, soldering, forging in copper, pewter, silver. Lec-tures and research on historic and contemporary examples. Prerequisites, 107, 110, 129.

#### ART

358 Jewelry Design (5) Jewelry design and construction, including stone setting and forging in silver and gold. Lectures and research on historic and contemporary examples. Prerequisites, 107, 110, 129.

ART 359 Enameling (5) Enamel design for metal work or jewelry, Discus discus Limoges, Cloissonné champlevé, Plique-à-jour, Limoges, Cloissonné 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) Emphasis on the development of visual ideas. Developing proficiency in working with equip-

ment and materials. Prerequisites, 206 for 366; 366 for 367: 367 for 368.

#### ART

410 Graphic Design (5)

Composition and history. Prerequisite, 368.

#### ART

411 Graphic Design (3 or 5, max. 15) Advanced photography. Emphasis on individual creative projects. Prerequisite, permission.

#### ART

436 Sculpture Composition (5, max. 15), Individual compositions in various media in large scale. Prerequisite, 15 credits from 332.

#### ART

439 Advanced Filmmaking (5, max. 15) Advanced individual projects in filmmaking. Prerequisites, 15 credits from 339 and permission.

#### ART

#### 445, 446, 447 Advanced Industrial Design (5,5,5)

Market analysis and selected professional prob-lems in industrial design. Consultation techniques; psychological, sociological, and eco-nomic factors involved in designing for consumer acceptance. Prerequisites, 318 for 445; 445 for 446; 446 for 447.

450 Advanced Printmaking (5, max. 15) Prerequisite, 6 credits from 351.

#### ART

451 Advanced Printmaking (5, max. 15) Prerequisites, 15 credits from 450 and permission.

#### ART

457 Advanced Metal Design (5) Individual problems in metal design and construction. Prerequisite, 357.

#### ART

458 Advanced Jewelry Design (5) Individual problems in jewelry design and construction. Prerequisite, 358.

#### ART

459 Advanced Enameling (5)

Individual problems in enameling. Prerequisite, 359.

#### ART

460 Advanced Metal Design (5, max. 15) Advanced individual projects in metal design. Prerequisites, 459 and permission.

#### ART

**463** Advanced Painting (3 or 6, max. 18) Development of individuality in painting through creative exercises. Prerequisites, 6 credits from 307 and 9 credits from 360.

#### ART

466, 467, 468 Graphic Design (5,5,5) Expression of ideas in terms of design, Variety of media and reproduction processes. Prerequisites, 368 for 466; 466 for 467; 467 for 468.

#### ART

#### 472, 473, 474 Advanced Interior Design (5,5,5)

Comprehensive problems related to contemporary needs, both public areas and residences, usually offered in conjunction with off-campus designers. Further research of historic interior masterpieces. Models, materials and their sources, perspective and working drawings. Prerequisites, 312 for 472; 472 for 473; 473 for 474.

#### ART

479, 480 Graphic Design (3,3) Prerequisites, 410 for 479; 479 for 480.

ART 485 Advanced Ceramic Art (5, max. 15) Pottery design and construction, stoneware, clay bodies, glazes. Prerequisite, 15 credits from 353.

#### ART

490 Art Education in the Schools (3) For school administrators and teachers requiring help in problems 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

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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

### Study Abroad—Studio Individual Projects (3-10, max. 20) 497

Prerequisite, permission.

#### ART

Individual Projects----Painting/Sculpture 498 (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 (\*)

**Courses for Undergraduates** 

201, 202, 203 History of Western Art (5,3,3)

Introduction to major achievements in the principal media from prehistoric times to the

ART 700 Master's Thesis (\*)

ART HISTORY

ART H



present. Illustrated lectures. 201: Ancient and Early Medieval; 202: Late Medieval and Renaissance: 203: Baroque and Modern. Prerequisites, sophomore standing for 201; 201 for 202; 202 for 203.

#### ART H

#### 204 Study Abroad: Art in London (3-5, max. 15)

General introduction to art and art history through the study of objects in London's museums, of buildings in and near London, and through selected readings and research projects. Specific course content is announced in Study Abroad bulletins. Prerequisite, permission.

### ART H

230 Black American Art (3)

History of Black American art as reconstructed from colonial times until the present, the African background, and extensions of Black art in the West Indies and in Brazil.

#### ART H

#### 301 Survey of Asian Art (5)

Origins and interplay of the major movements of Asian art.

#### ART H

### 305 Survey of Medieval Art (5)

Art of Europe from the beginnings of Christian art in the late Roman Empire to the end of the fourteenth century. The course is designed for the art history major, but is open to any student, and treats the major monuments and acquaints the student with the bibliography.

#### ART H

# 306 Survey of Renaissance Art (5)

Sculpture, painting, and architecture in Europe from 1300 to 1600, with main emphasis on Italy.

#### ART H

#### 307 Baroque and Rococo Art (5)

Opperman

Arts and architecture of Europe from the end of the sixteenth century to the latter half of the eighteenth century. Prerequisite, sophomore standing or permission.

#### ART H

#### 308 Survey of Modern Art (5)

Art of Europe and America from the late eighteenth century to the present, with emphasis on stylistic and thematic changes in painting.

#### ART H

#### Tribal Art (5) 331

Bravmann

Survey of the arts of sub-Saharan Africa, pre-Columbian America (North and South), and the Pacific islands, including Australia and New Zealand, from prehistoric times to the ethnographic present.

#### ART H

#### 333 Art of the Northwest Coast Indian (3) Holm

Northwest coast Indian art, with emphasis on the structure and style of two-dimensional art of the northern tribes. Offered jointly with the Department of Anthropology as ANTH 333. Prerequisite, sophomore standing.

#### ART H

#### 334 Art of the Northwest Coast Indian (3) Holm

Three-dimensional art of the Northwest coast culture area, with emphasis on esthetic principles, techniques, cultural functions. Offered jointly with the Department of Anthropology as ANTH 334. Prerequisite, sophomore standing.

#### ARTH

#### 335 Art of the Northwest Coast Indian (3) Holm

Northwest coast Indian art as related to drama and dance, with special attention to the Southern Kwakiutl. Offered jointly with the Department of Anthropology as ANTH 335. Prerequisite, sophomore standing.

#### ART H

#### 340 Pre-Classical Art and Archaeology (3) Edmonson

Survey of the art and the other material remains of the civilizations in the Aegean from the Neolithic Age to the end of the Bronze Age, with special emphasis on Minoan Crete and the Myacenaean kingdoms of mainland Greece; illustrated by slides. The history, techniques, and results of significant excavations are examined. Offered jointly with the Department of Classics as Classical Archaeology 340.

#### ART H

#### 341 Greek Art and Archaeology (3) Bliquez, Edmonson

Survey of the material remains and the developing styles in sculpture, vase painting, architecture, and the minor arts from the Geometric to the Hellenistic periods; illustrated by slides. Principal sites and monuments, as well as techniques and methods of excavation, are examined in an attempt to reconstruct the material culture of antiquity. Offered jointly with the Department of Classics as Classical Archaeology 341.

#### ART H

#### 342 Roman Art and Archaeology (3) Pascal, Vignoli

Roman architecture, painting, and sculpture, with emphasis on the innovations of the Romans in these areas; illustrated by slides. Offered jointly with the Department of Classics as Classical Archaeology 342.

#### **ART H**

381 History of Painting Since the Renaissance

(2) Moselev

#### Illustrated lectures. Prerequisite, 203.

#### ART H

382 History of Modern Sculpture (2) Sculpture from the Renaissance to the present; lectures and slides. Prerequisite, 203.

#### ART H

391 History of Pottery (3)

Kottler Survey of stylistic and technical history of world pottery. Prerequisite, junior standing in art.

#### ART H

### 392 History of Printmaking (3)

Alps Selective survey of major artists and media in the field of printmaking. Prerequisite, junior standing in art.

#### ART H

#### 401 Oriental Ceramic Art (2)

Rogers

Survey illustrated by specimens in the collection of the Seattle Art Museum. Prerequisite, 301 or major standing in ceramic art.

#### ART H

404 Study Abroad: Art in London (3-5, max. 15)

Advanced or specialized work in art history based on materials available in the museums, private collections, libraries, and buildings of London, conducted through lectures, reading and research projects. Specific course content is determined by the assigned faculty member and is announced in Study Abroad bulletins. Prerequisite, permission.

#### ART H

#### 406 Study Abroad: Art in Provence (5, max. 15)

Monuments in and around Avignon. Emphasis on Roman and Romanesque architecture and sculpture, later medieval French painting, great works of all periods and countries in regional museums, and the Provencal landscape of Cézanne, Van Gogh, and Gauguin. Prerequisite, permission.

#### ART H

#### 411 Early Chinese Painting: T'ang to Ydan (3)

Webb

Study of the changing styles and attitudes accompanying the development of painting (particularly landscape painting) in China from earliest times. Prerequisite, upper-division standing.

#### ART H

- 412 Later Chinese Painting: Yuan Through Ch'ing (3)
  - Webb

Chinese painting from the time that the study of individual masters became the main task at hand. Prerequisite, upper-division standing.

#### ART H

#### 415 Early Japanese Painting: Twelfth to Sixteenth Century (3)

Webb

Yamato-e and the art of the illustrated handscroll of Heian and Kamakura times, and the ink landscape tradition associated with Shubun Sesshu. Prerequisite, upper-division and standing.

#### ART H

#### 416 Later Japanese Painting: Sixteenth to Nineteenth Century (3) Wehh

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

#### Buddhist Painting of China and Japan (3) 417 Webb

Survey of Buddhist painting in China and Japan from the fifth century until circa 1300. Prerequisite, upper-division standing.

#### ART H

#### 418 Buddhist Sculpture of China and Japan (3)

Webb

Survey of Buddhist sculpture in China and Japan from the fifth century until circa 1300. Prerequisite, upper-division standing.

#### ART H

#### 419 Chinese and Japanese Architecture (3) Webb

Religious and secular architecture of China and Japan, with emphasis on Japanese temples and shrines. Prerequisite, upper-division standing.

#### ART H

420 Study Abroad: Art and Architecture of the Kansai (8)

Wehh

Study, conducted in the field and in lecture/ discussion sessions, of all the important monuments of Japanese art in the temples, shrines, and museums of Kyoto, Otsu, Nara, Osaka, and their vicinities.

#### ART H

421 Art of India (3)

Rogers Stylistic and iconographic study of the art of India. Prerequisite, 301 or permission.

### ART H

431 Primitive Art I (3)

Bravmann

Arts of Mesoamerica, South America, and Oceania.

#### ART H

432 Primitive Art II (3)

Bravmann Arts of New Guinea, Australia, and Africa.

#### ART H

436 Arts of Sub-Saharan Africa I (3) Bravmann -

Tribal arts of the Western Sudan and the Western Guinea coast with their archaeological antecedents.

#### ART H

437 Arts of Sub-Saharan Africa II (3) Bravmann

Tribal arts of the Central Guinea coast, Nigeria, the Cameroons, and Gabon.

#### ART H

#### Arts of Sub-Saharan Africa III (3) 438 Braymann

Tribal arts of the Congo, Southern Savannah, and clusters of artistic traditions outside of generally defined artistic maps of Africa.

#### 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)

Edmonson

Shapes, fabrics, and decorations from the Neolithic period to the sixth century A.D. Offered jointly with the Department of Classics as Classical Archaeology 442. (Offered alternate years; offered 1975-76.)

#### ART H

#### Greek and Roman Sculpture (3) 444 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 the Department of Classics as Classical Archaeology 444. (Offered alter-nate years; offered 1975-76.)

#### ART H

#### 453 Romanesque Art (5) Christofides

History of Western European art in the eleventh and twelfth centuries. The course focuses on monuments along the pilgrimage roads to Compostela in France and Spain. Prerequisite, upper-division standing.

#### ART H

#### 461 Early Renaissance Painting (3)

Painting of the fourteenth and fifteenth centuries in Florence and Siena. Prerequisite. familiarity with vocabulary of art or with related history.

ART H

462 High and Late Renaissance Painting (3) Painting of the sixteenth century in Florence and Rome. Prerequisite, familiarity with vocabulary of art or with related history.

#### ART H

463 Early Renaissance Sculpture (3) Sculpture of the late thirteenth, fourteenth, and fifteenth centuries in the Florentine tradition. Prerequisites, 201, 202, or equivalent background.

#### ART H

#### 465 Renaissance Architecture and Architectural Theory (3, max. 9)

Architecture in Italy (1400-1600) from Brunelleshi to Palladio, with an emphasis on the development of Renaissance architectural theory from Alberti to Palladio and Vignola. Prerequisite, 202 or 306 or Architecture 351.

#### ART H

469 Problems in Northern European Art (3, max. 12)

Evolution of Northern European art during the fifteenth through seventeenth centuries treated in such a manner as to direct the attention of students to the many points of iconography, style, and attribution that need clarification. The major artistic traditions of this area are covered during four academic quarters. Prerequisite, upper-division standing.

ART H 470 Problems in the Hispanic Arts (3, max. 9) Various specific areas within the general range of Spanish and Latin American arts in the Renaissance and the Baroque are dealt with in successive quarters; among them: Mexican colonial architecture; the Renaissance in Spain; the arts of the Spanish Baroque; etc. Prerequisite, 306 or 307, or permission.

#### ART H

#### 471 Masters and Monuments of Counter-Reformation-Rome (3) Opperman

Works and impact of the major architects, sculptors, and painters active in Rome from the death of Michelangelo to the death of Bernini (1564-1680). Concentration upon Caravaggio, Bernini, Pietro da Cortona, Poussin, and Borromini. Prerequisite, 307 or permission.

# ART H

#### 472 Art in France: Henry IV-Louis XVI (3) Opperman

Architecture, painting, sculpture, decoration. The classic ideal: formation, zenith, extinction around 1700, and rebirth in the later eighteenth century. Main points: Versailles, Watteau, the decorators of the Rococo, and tendencies of the period. Prerequisite, 307 or permission.

#### ÁRT H

#### 473 Dutch Painting of the Golden Age (3) **Opperm**'an

Genesis, development, and decline of painting in the United Provinces from their independence in 1581 to the end of the seventeenth century. Emphasis upon the antimannerist reaction in Utrecht, Frans Hals, Rembrandt, and upon the origins of Dutch genre traditions. Prerequisite, 307 or permission.

#### ART H

#### 474 Problems in Eighteenth Century Art (3, max. 12)

Selected problems in the art and art theory of eighteenth-century Europe and America. Different topics are covered each time the course is offered; among them: Watteau and the French Rococo; Neoclassicism; Central Europe in the eighteenth century; English art. Prerequisite, 307 or permission.

#### ART H

#### 478 History of English and American Interior Design (3)

Hill

Illustrated lectures on the evolution of furniture and interior architecture. (Formerly 283.)

#### ART H

#### 479 History of Italian and French Interior Design (3) Sp

#### Leiner History of interior architecture and furnishings of Italy and France from the Dark Ages to

the early nineteenth century. Prerequisite, 203.

#### ART H

481 Origins of Modern Art (3)

Kingsbury Stylistic and iconographic study of European painting and sculpture from 1750 to 1848. Prerequisite. 203.

#### ART H

#### 482 Impressionism and Post-Impressionism (3)

Kingsbury

Stylistic and iconographic study of European painting and sculpture from 1848 to 1900. Prerequisite, 203.

#### ART H

#### 483 Art of the Twentieth Century (3) Kingsburv

Painting and sculpture in Europe and America from 1900 to the present. Prerequisite, 203.

#### ART H

#### 484 Thematic Studies in Modern Art (3, max. 6) Sp

Kingsbury

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 308 or permission.

#### ART H

#### 485 **French Art and Literature: Period** Studies (5) Sp

Innes

Comparative studies of theme and technique in art and literature to illustrate major concerns of a particular period as expressed in these two media. Offered jointly with the Department of Romance Languages and Literature as French 458: Prerequisite, background in French literature or art history (the appropriate 300level course in art history or the appropriate 400-level survey course in French literature).

#### ART H

#### 486 History of American Art-Colonial Period (3)

Reed

Survey of Architecture, town design, painting, sculpture, and the decorative arts in the United States from original European settlement to the Revolutionary War. Prerequisite, junior standing.



487 History of American Art to 1913 (3) Survey of American art, especially painting, to the Armory Show, with attention to major figures, the American culture context, and parallel European trends. Prerequisite, familiarity with vocabulary of art or with related history or literature.

#### **ART H**

491, 492, 493 Art History and Criticism (3,3,3)

#### ART H

496 Study Abroad—Art History Individual Projects (3-10, max. 20)

For participants in Study Abroad programs. Prerequisite, permission.

#### ART H

498 Individual Projects-Art History (3 or 5, max. 15) Prerequisite, permission.

**Courses for Graduates Only** 

#### ART H

#### 500 Methods of Art History (3)

Introduction to the specialized bibliography of art historical research and to the wide variety of approaches to art historical problems of all periods and regions. Prerequisite, graduate student standing in art history; others by 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) Webb

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) Webb

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) Rogers

Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of India. Prerequisite, 421.

#### ART H

#### 531 Seminar in Tribal Art (3, max. 9)

Methodological and cross-disciplinary 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) Opperman

Iconographic and stylistic problems of the art

of the Baroque period, with emphasis on the principal research methods, theories, and types of literature dealing with the art of the seventeenth and eighteenth centuries in Europe. Prerequisite, permission.

#### ART H

581 Problems in Modern Art (3, max. 9) Kingsbury

Art-historical problems of the nineteenth and twentieth centuries. Prerequisite, permission.

#### ART H

Seminar in Criticism of Contemporary 590 Art (3, max. 9)

Seminar on 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 LANGUAGES AND LITERATURE

### **Courses for Undergraduates**

#### CHINESE .

#### CHIN

101, 102, 103 Spoken Cantonese (3,3,3) A,W,Sp

Provides students with instruction in a major dialect of Chinese in addition to the traditional courses in the Mandarin dialect. Basic 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 Intensive. In conjunction with 222 and 223, covers material of 111, 112, 113 and 211, 212, 213 in three quarters.

#### 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 Second-Year Chinese (5) A Yen

Continuation of 134. Prerequisite, 113 or 134, or permission.

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# ARTS AND SCIENCES

### CHIN

#### 212 Second-Year Chinese (5) W Yen

Continuation of 211. Prerequisite, 211 or permission.

#### CHIN

#### 213 Second-Year Chinese (5) Sp Yen

Continuation of 212. Prerequisite, 212 or permission.

#### CHIN

#### 222 Accelerated Chinese (10) W . Norman

Intensive. In conjunction with 121 and 223, covers material of 111, 112, 113 and 211, 212, 213 in three quarters.

#### CHIN

#### Accelerated Chinese (10) Sp 223

Norman Intensive. In conjunction with 121 and 222, covers material of 111, 112, 113 and 211, 212, 213 in three quarters.

#### CHIN

300 Advanced Chinese Conversation (1-3, max. 9) AWSp Yen

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, or equivalent.

#### CHIN

334 Third-Year Intensive Chinese (15) S Prerequisite, 213 or 223, or equivalent. (Offered Summer Quarter only.)

#### CHIN

#### **Chinese Reference Works and** 407 Bibliography (3) A Lo

Introduction to the methodology of Sinology. Prerequisite, 300 or 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

Yen

Introduction to reading current materials from People's Republic of China. Learning of simplified characters and new terminology.

Practical phonetics with special application to

the problem of articulation improvement. Mor-

phology with application to vocabulary build-

ing, use of particles and syntax. Prerequisite,

#### CHIN

313.

#### 441, 442, 443 Structure of Chinese (3,3,3) A,W,Sp

#### CHIN

451, 452, 453 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

Accelerated Classical Chinese (10) S 454 Serruvs

Same focus and method as 451, 452, 453. Nonmajors only. Prerequisite, 213 or 223.

#### CHIN

#### 461, 462, 463 Chinese Literature (5,5,5) A,W.Sp

Knechtges

461: lectures on Chinese literature from earliest times to the end of Han. 462: lectures on Chinese literature from the end of Han to the end of T'ang. 463: lectures on Chinese literature since T'ang times. Prerequisite, 213 or 223, or equivalent.

#### CHIN

#### 499 Undergraduate Research (3-5, max. 15) AWSDS

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 grammatical forms and structures. Oral and writing practice based on Hindi prose readings. Prerequisite, 203 or equivalent.

#### HD UR

401, 402, 403 Advanced Hindi (5,5,5) A,W,Sp Prerequisite, 303 or equivalent.

#### **HD UR**

#### 499 Undergraduate Research (3-5, max. 15) AWSpS

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 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) AWSpS

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

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

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

#### 331, 332, 333 Intensive Japanese (15,15,15) A.W.Sp

Niwa

331: oral-aural approach to modern Japanese. Requires full-time commitment by the student. Attendance at language laboratory hours required in addition to regular five-hour day. 332: first-year reading Japanese. Reading and translation of modern Japanese. Classes conducted principally in Japanese, Prerequisite, 331 or permission. (Same material covered as in 211, 212, 213.) 333: second-year reading Japanese. Reading and translation of modern Japanese. Classes conducted principally in Japanese. (Same material covered as in 311, 312, 313.) Prerequisite, 332 or 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, 411, 412, 413, or equivalent.

# 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.

#### JAPAN

461, 462, 463 Readings in Modern Japanese Literature (3-5,3-5,3-5) A,W,Sp Takaya

Close reading and discussion of representative works of twentieth-century poetry, fiction, and drama in the original text. Prerequisite, permission.

#### JAPAN

499 Undergraduate Research (3-5, max. 15) AWSpS

For Japanese language and literature majors. Prerequisite, permission.

#### KOREAN

#### KOR

211-212, 213 Elementary Korean (5-5,5) A,W,Sp

Lukoff

Introduction to the modern standard Korean spoken and written language.

#### KOR

#### 311, 312, 313 Intermediate Korean (5,5,5) A,W,Sp



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 '

#### Undergraduate Research (3-5, max. 15) 499 AWSpS

For Korean language and literature majors. Prerequisite, permission.

#### MONGOLIAN

#### MONG

302 Introduction to Mongolian (5) A Beginner's grammar, easy texts.

#### MONG

303 Modern Mongolian Literary Language (5) W

Grammar, syntax, and styles of modern Mongolian based on colloquial and Cyrillic alphabet. Prerequisite, 302.





304 Colloquial Mongolian (5) Sp Grammar of the spoken language in Outer and Inner Mongolia. Reading of colloquial texts, translation into English, conversation in Mongolian. Prerequisite, 303.

#### MONG

305 Classical Mongolian (5) A

Grammar, syntax, styles of the Mongolian written language of the seventeenth to twentieth centuries. Prerequisite, 304.

#### 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.

#### MONG

#### Advanced Manchu Reading (3) W 307 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

#### 402, 403, 404 Intermediate Mongolian (5,5,5) A,W,Sp

Selected readings in modern Mongolian literature, history, political science, and newspaper materials. Prerequisite, 304 or equivalent.

#### MONG

#### 499 Undergraduate Research (3-5, max. 15) AWSD

For Mongolian language and literature majors. Prerequisite, permission.

### SANSKRIT

#### SNKRT

301, 302, 303 Introduction to Sanskrit (5,5,5) A,W,Sp

Thrasher Intensive study of the basic grammatical struc-

ture 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 kahvya text or texts, ordinarily a drama or major prose work. Prerequisite, 303.

#### SNKRT

#### 411, 412, 413 Advanced Sanskrit (5,5,5) A.W.Sp

Thrasher

Intensive reading and analysis of classical texts, chosen from the sastraic or belletristic literatures. Prerequisite, 403 or permission.

#### SNKRT

493 Introduction to Vedic Study (5) Sp Thrasher

Reading of selected Vedic hymns, with extensive linguistic and historical analysis; problems of comparative grammar in relation to Sanskrit. Prerequisite, 403.

#### SNKRT

#### 494 **Readings in Religious Classics of India** (5) Sp

Potter, Thrasher

Introduction to the older religious literature. with emphasis on the Upanisads, the Dharmasastras, and the Bhagavad Gita. Rapid reading of the texts, plus content analysis of the developing religious forms. Prerequisite, 402.

#### SNKRT

495 Studies in Indian Thought (3, max. 9) A 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) AWSD

For Sanskrit language and literature majors. Prerequisite, permission.

#### TAMIL

#### TAMIL

#### 201-202, 203 Elementary Tamil (5-5,5) A.W.Sp

Schiffman

Intensive introduction to the modern spoken language. Transformation drills are empha-sized. The writing system and literary dialect are introduced at a suitable stage.

#### TAMIL

204, 205, 206 Elementary Kannada (5,5,5) A,W,Sp

Schiffman

Intensive introduction to the modern spoken language. Transformation drills and the writing system and literary dialect.

#### TAMIL

301-302, 303 Intermediate Tamii (5-5,5) A,W,Sp Schiffman

Intensified use of the modern spoken language, beginning with moderately difficult conversation and drills, and working up to more advanced materials, including radio, plays, continuation of work with written language. Prerequisite, 203.

#### TAMIL

#### 401, 402, 403 Advanced Tamil (5,5,5) A,W,Sp Schiffman

Readings in modern literary Tamil. The modern novel and short story as seen in the writings of such writers as Jeyakanthan, Putumaippittan, Vayyavan, Janakiraman, Sundara Ramaswamy, and Ramamirthan. Laboratory sessions continue practice in the colloquial dia-lect. Prerequisite, 303.

#### TAMIL

455 Structure of Dravidian (3) Schiffman

Comparative description of the phonological and syntactic system with emphasis on areal features and shared rules of Tamil, Telugu, Kannada, or Malayalam. As appropriate, contrasting examples are taken from the lesser Dravidian languages, particularly those of the northern Dekkan. Dravidian group as a source of a major set of borrowings of linguistic features by the North Indian (Indic) language group. (Offered upon demand.)

#### TAMIL

499. Undergraduate Research (3-5, max, 15) AWSnS

For Tamil language and literature majors. Prerequisite, permission.

THAT

#### 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. Intro-duction 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. Prerequisites, 301 for 302; 302 for 303.

#### 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 where material is discussed. Review of structure. Prerequisites, 303 or equivalent for 401; 401 for 402; 402 for 403.

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

Nornang

Introduction to phonology, morphology, and syntax of spoken Tibetan (Lhasa dialect) by the inductive method.

#### TIB

#### 404, 405, 406 Literary Tibetan (3,3,3) A,W,Sp Wylie

Introduction to the phonology, grammar, and syntax of written Tibetan. Materials selected for rapid development of reading knowledge.

#### TIB

#### 414 Readings in Tibetan (3, max. 9) AWSp Nornang, Wylie

Selections from various Tibetan materials. Prerequisite, 406 or equivalent.

#### TIR

421, 422, 423 Advanced Colloquial Tibetan (5,5,5) A,W,Sp Nornang Instruction and drill in advanced colloquial

sentence patterns and syntactical constructions.

### TIB

#### 499 Undergraduate Research (3-5, max. 15) AWSpS

Nornang, 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 alter-nate years; offered 1974-75.)

#### TKIC

#### 401, 402, 403 Intermediate Uzbek (3,3,3) A,W,Sp

Cirtautas

Continuation of Turkic 301, 302, 303. Oral work, grammar, and readings in Uzbek literature on the advanced level. Prerequisites, 301, 302, 303, or permission.

### TKIC

#### 404 Survey of Turkic Languages (3) A Cirtautas

Linguistic outlines of modern Turkic languages. Brief phonetical, morphological, and syntac-tical analysis of selected materials. Of interest to students of Turkic, anthropology, and linguistics.

#### TKIC

#### 411, 412, 413 Advanced Uzbek (3,3,3) A,W,Sp

Cirtautas

Continuation of 401, 402, 403. Reading of selected Uzbek writers. Prerequisite, 403 or equivalent.

#### TKIC

#### 499 Undergraduate Research (3-5, max. 15) AWSpS

For Turkic language and literature majors. Prerequisite, permission.

#### LITERATURE COURSES IN ENGLISH

#### CHIN

Vernacular Chinese Literature 361 in Translation (5) Sp Brandauer

Survey of modern and premodern literature written in the vernacular language, including the novel, the short story, drama, and poetry. Works are read in translation.

#### CHIN

#### 362 **Chinese Literature in Translation:** Middle and Early Modern Periods (5) W Brandauer

Survey of classical Chinese literature exclusive of vernacular literature from the T'ang dynasty through the Ch'ing dynasty (A.D. 618-1911). Genres studied include poetry, rhyme-prose, prose essays, and the classical short story. Works are read in translation.

### CHIN

#### 363 Chinese Literature in Translation: Ancient Period (5) A Wang

Survey of classical Chinese literature from earliest times to the T'ang dynasty (A.D. 618). Genres studied include poetry, rhyme-prose, narrative, expository, and philosophical prose. Works are read in translation.

#### INDN

#### **Classical Indian Literature in** 420 English (5) A

General survey with special attention to his-torical, philosophical, and cultural background. Knowledge of the Sanskrit language is not required.

#### INDN

#### 421 Modern Indian Literature in English (5) W

General survey of the contemporary literature with special attention to the fusion of modernistic trends with tradition. Knowledge of an Indian language is not required.

# JAPAN

421 Japanese Literary Tradition in English (5) A

Takaya Broad inquiry into the literary heritage of Japan through reading and discussion of representative works available in English in prose, poetry, and drama from early beginnings to mid-nineteenth century.

#### JAPAN

#### 422 Tokugawa Literary Tradition in English (5) W Takaya

Survey course in Japanese literature covering the period between 1600 and 1867, when the rise and development of popular literature and theatre among the common people had reached the highest peak through men like Chikamatsu, Saikaku, and Basho. Readings and discussion of representative works in prose, poetry, and drama up to the beginning of Meiji period.

#### JAPAN

#### 423 Modern Japanese Literature in English (5) Sp

Takava

Discussion and analysis of representative works, especially of fiction, from the late nineteenth and twentieth centuries.

### JAPAN

#### 441 Studies in Japanese Poetry in

English (5) W McKinnon

Traditions and techniques; systematic investigation of the major poetic forms, focusing on representative poets and their works.

#### JAPAN

#### 442 Studies in Japanese Prose in English (5) A

McKinnon

Close examination of a select number of works that trace the development and diversity of Japanese prose literature from eighth-century prototypes to the experimental present. Particular attention is given to the evolution of modes of fiction, the role and influence of diary literature and journals, the concept of the novel and the short story, and the critical position poetry occupies in the shape and esthetics of prose works. The impact of literary examples from other countries, Asian and Western, also discussed.

#### JAPAN

#### 443 Studies in Japanese Drama in English (5) Sp McKinnon

Principal forms, techniques, and theory of No, Kyogen, Joruri, and Kabuki; also the contemporary theatre. Aspects of the stage, costume, masks, and other accoutrements of the theatre are discussed, along with its principal playwrights and performers.

#### KOR

320 Korean Literature in English (5) Sp Historical development of Korean literature. Special consideration of the relationship with Chinese and Japanese literature.

#### MONG

Mongolian Literature in 320 English (5) Sp

## TKIC

#### 320 Eastern Turkic Literature in English (3) A

Cirtautas

Covers both the historical (Chaghatai XV-XIX Centuries) and the modern (mainly Uzbek) pe-riods 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.

#### **Courses for Graduates Only**

# ASIAN LANGUAGES AND LITERATURE

#### ASIAN

600 Independent Study or Research (\*) AWSpS

ASIAN

### 700 Master's Thesis (\*) AWSpS

ASIAN

### 800 Doctoral Dissertation (\*) AWSpS

#### CHINESE

#### CHIN

540 Seminar in Chinese Linguistics (3, max. 9) WSp

#### Norman

Advanced phonology, problems of archaic Chinese, dialectology; descriptive and historical treatment of Sinitic languages. For advanced students of Chinese or of linguistics. Prerequisite, permission.

#### CHIN

#### 541 Chinese Phonology (3) A Norman

#### CHIN

542, 543 Introduction to Texts in Ancient Script (3,3) W,Sp

#### Serruys

Structure of Chinese characters. Development of Chinese script and related problems. Se-lected texts of inscriptions. 542: Shuo Wen. 543: Bronzes I. Prerequisite, permission. (Of-fered alternate years; offered 1975-76.)

# CHIN 545, 546 Introduction to Texts in Ancient Script (3,3) W,Sp

Structure of Chinese characters. Development of Chinese script and related problems. Selected texts of inscriptions. 545: Bronzes II and





Bone Inscriptions I. 546: Bone Inscriptions II. Prerequisites, completion of 543 and permission. (Offered alternate years; offered 1974-75.)

#### CHIN

#### 551 Readings in Classical Chinese (5) A Serruys

Continuation of 451, 452, 453. Focus on early Chou texts: problems of textual criticism and grammar. Prerequisites, 451 for 452, 452 for 453, or permission.

#### CHIN

#### 552, 553 Readings in Chinese Dynastic Histories (5,5) W,Sp

Knechtges

552: readings in selections of Shih chi, Han shu, Tsin shu. 553: readings in selections of T'ang shu, Sung shih, Ming shih. Prerequisites, 551 for 552; 552 for 553.

#### CHIN

#### 560 Proseminar in Chinese Literature (5, max. 15) AWSp Knechiges

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. (Offered 1975-76.)

#### CHIN

571 Seminar in Chinese Poetry (5, max. 15) Sp

### Wang

Directed study of selected works of poetry. Subject emphasis varies each year. Prerequisite, permission.

#### 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

#### 583 Seminar in Chinese Fiction (5, max. 15) A Brandauer

Directed study of selected works of fiction, focusing on the vernacular short story and novel. Prerequisite, permission.

#### CHIN

# 591, 592, 593 Studies in the History of

Chlnese Thought (5,5,5) A,W,Sp Directed readings in selected traditional philosophical texts (*Chuang-tzu*, *Han-fei-tzu*, *Lun-heng*, *Shih-shuo hsin-yü*), 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

Survey of contemporary Hindi-Urdu prose.

Readings by Premchard, 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.

### JAPANESE

#### JAPAN

501 Readings in Bibliographical Materials (5) W

#### Hiraga

Intensive reading and discussion of materials from principal bibliographical sources in the social sciences and the humanities pertaining to Asia. Reports on selected topics and problems. Prerequisite, 413 or permission.

#### 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

#### 547 Seminar on Japanese Linguistics (3) Sp Miler

Directed study in problems in the history and structure of the Japanese language. Prerequisites, 405, 406, or permission.

#### JAPAN

551, 552, 553 Readings in Classical Japanese Literature (3-5,3-5,3-5) A,W,Sp McKinnon

Readings in prose, poetry, and drama, antiquity to nineteenth century. Prerequisite, permission.

#### JAPAN

560 Seminar in Japanese Theatre (3-5, 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, Japanese theatre courses in English or advanced courses in Japanese or permission. (Offered alternate years.)

#### JAPAN

580 Colloquium in Japanese Literature (3-5, max. 15) A

McKinnon, Takaya

Advanced course in Japanese literature in which the students may have the opportunity of studying under scholars and specialists from Japan who will be affiliated with the department on temporary basis. Prerequisite, permission.

#### JAPAN

590 Seminar in Japanese Literature (3-5, max. 15) AWSp

#### McKinnon

Close examination of selected periods, writers, or genres, including problems of literary criticism in Japanese literature. Prerequisite, 15 credits in 462 or 553. (Offered alternate years.)

#### KOREAN

#### KOR

501, 502, 503 Seminar in Korean (3-5,3-5, 3-5) A,W,Sp

#### Lukoff

#### KOR

#### 521, 522, 523 Modern Korean Literature (5,5,5) A,W,Sp Suh

Readings in important works in Korean literature of the twentieth century. Prerequisite, 413 or permission. (Offered alternate years; offered 1975-76.)

#### 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 1974-75.)

#### 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, Korean 413, Chinese 451 or Japanese 413, or permission. (Offered alternate years; offered 1975-76.)

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 1974-75.)

#### MONGOLIAN

#### MONG

521 Ancient Mongol: hPhagspa Script (3) A Script and grammar of hPhagspa texts; reading and translation. Prerequisite, 305.

#### MONG

#### 522 Mongol: Ancient Texts (3) W

Grammar and reading of Mongol texts of the fourteenth to seventeenth centuries. Historical texts are emphasized.

#### MONG

579 Comparative Altaic Linguistics (3)

Comparative phonology and morphology of Mongol and Turkic and other related languages. Offered jointly with the Department of Linguistics as Linguistics 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. (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 Pahani's grammar. Prerequisite, 403 or permission; 550 rec-ommended. (Offered alternate years.)

#### SNKRT

#### 560 Readings in Philosophical Sanskrit (3, max. 9) AWSp

Potter

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. Prerequisites, 401, 402, 403 or permission.

#### TIBETAN

#### TIB

#### Advanced Literary Tibetan (3, max. 9) 500 AWSp

Nornang, Wylie Reading of manuscripts and xylographs with emphasis on biographical, historical, and geographical material. Prerequisite, 406 or equivalent.

#### TIB

#### Buddhistic Tibetan (2, max. 6) AWSp 534

Ruegg Reading of Buddhist literature in translation and original Tibetan compositions. Prerequisite, 406 or equivalent.

#### TIB

#### 544 Ancient Tibetan Documents (2, max. 6) AWSp

Wylie Reading of selections from ancient documents, inscriptions, and annals. Prerequisite, 406 or equivalent.

#### TURKIC

### TKIC

542, 543 Comparative and Historical Grammar of Turkic Languages (3,3) W,Sp

Cirtautas

Classification of the Turkic languages; alpha-

bets used; phonology, morphology, and syntax; lexical composition; structure changing developments. Prerequisites, 303 or 404, or 103. (Offered alternate years; offered 1975-76.)

#### TKIC

### 546 Old Turkic (3) W

Cirtautas Introduction to Runic script; phonology, morphology, and syntax of the oldest form of Turkic; reading and translation of seventh- and eighth-century inscriptions, of importance for the history of the Turks during this period. Prerequisite, permission. (Offered alternate years; offered 1975-76.)

#### TKIC

#### Old Uighur (3) Sp 547 Cirtautas

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 1975-76.)

#### TKIC

#### 561, 562 Middle Turkic (3,3) A,W Cirtautas

Introduction to the phonology, morphology, and syntax of the Middle Turkic languages; reading and translation of texts in Karakhanid (eleventh-twelfth centuries), Khorazmian Turkic (thirteenth-fourteenth centuries), Kipchak (thirteenth-fourteenth centuries), and Chagatai (fifteenth-sixteenth centuries). Prerequisites, 301, 302, 303 or 542, 543 or 546, 547. (Offered alternate years; offered 1974-75.)

#### TKIC

#### Seminar on Turkic Literature (5) Sp 563 Cirtautas

Oral literature (epic, tales, songs); written literature; traditions and techniques. Special consideration is given to the relationship between oral and written literature, and the influences of foreign literatures (Persian, Arabic, Russiah). Prerequisite, permission. (Offered alternate years; offered 1974-75.)

### ASTRONOMY

#### **Courses for Undergraduates**

#### ASTR

#### 101 Astronomy (5) AWSp

The solar system, stars, galaxies, and cosmology.

#### ASTR

#### 102 Introduction to Astronomy (5) Sp Survey of the solar system, stars, galaxies, and

cosmology. Prerequisite, one year of high school physics or Physics 101-102 or 110, 111, 112.

# ASTR 201 The Universe and the Origin of Life (5)

Continuation of 101 and 102, emphasizing modern views of the atomic and molecular evolution of the universe from the initial "big bang" through the formation of the solar system and the emergence of biologic forms on the earth. The latter part of the course considers questions about the existence of, and communication with, extraterrestrial intelligent life, and finally the ultimate fate of the cosmos.

#### ASTR

#### 301 Astronomy for Scientists and Engineers (3)

Introduction to astronomy for students in the physical sciences. Prerequisite, Physics 123.

#### ASTR

#### 321, 322, 323 Basic Astronomy (3,3,3) A.W.Sp

Intended for physical scientists, this course gives a mathematically oriented treatment of positional astronomy, celestial mechanics, the planets and interplanetary medium, the sun and stellar spectra, luminosities, radii, and temperatures. Prerequisites, Physics 123 and calculus.

#### ASTR

# 431, 432, 433 Astrophysics and Cosmology (3,3,3) A,W,Sp

Stellar structure, energy sources and compositions. Interstellar gas and dust, its temperature, density, and interactions with stars. Star clusters, the galaxy, external galaxies, and cosmology. Prerequisite, Physics 322 or 325.

#### ASTR

#### 499 Undergraduate Research (\*, max. 15) AWSD

Current or special astronomical problems. Prerequisite, permission.

#### **Courses for Graduates Only**

#### ASTR

#### 500 Seminar in Elementary Astronomy Instruction (1)

Seminar in the preparation of lecture and workshop materials with emphasis on demonstration and visual aids, and on evaluation of students' progress.

#### ASTR

### 501 Solar System Astrophysics (3)

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 in Planetary Atmospheres (2)

#### ASTR

#### 507 Physical Foundations of Astrophysics I (3)

Survey of thermodynamics from an astronomer's point of view: black body radiation, basic radiative transfer, equation of state, degenerate gases, crystallization of high density, introduction to hydrodynamics and gas dynamics for astronomers: turbulence, convection, shock waves, radiation gas dynamics.

#### ASTR

#### 508 Physical Foundations of Astrophysics II (3)

Introduction to 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, Physics 513 or equivalent.



#### 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, Physics 421 or equivalent.

#### ASTR

#### 523 Solar Physics (3) Sp

Sun as a star, solar photosphere and outer convection zone, granulation and related phenomena, solar chromosphere, and corona, solar activity (especially sunspots and solar flares), sun's radio emission, solar-terrestrial relations. Prerequisite, 521.

#### ASTR

# 531 Stellar Interiors (3)

Physical laws governing the temperature, pressure, and mass distribution in stars. Equation of state, opacity, nuclear energy generation. Models of main sequence stars. Prerequisite, Physics 421 or equivalent.

#### ASTR

#### 532 Stellar Evolution (3)

Theoretical and observational approaches to stellar evolution. Prerequisite, 531.

#### ASTR

#### 541 Interstellar Matter (3)

Physical conditions and motions of neutral and ionized gas in interstellar space. Interstellar dust, magnetic fields, formation of grains, clouds, and stars. Prerequisite, modern physics or permission.

#### ASTR

551 Stellar Dynamics (3) Kinematics and dynamics of stars in clusters and galaxies. Prerequisites, classical mechanics and differential equations.

#### ASTR

# 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)

Current research topics in astronomy and astrophysics. Prerequisite, permission.

#### ASTR

**Topics in Observational Astrophysics** 597 (1-5)

#### ASTR

598 Topics in Theoretical Astrophysics (1-5)

#### ASTR

600 Independent Study or Research (\*) AWSD

ASTR 700 Master's Thesis (\*) AWSp

ASTR

800 Doctoral Dissertation (\*) AWSp

### **ATMOSPHERIC SCIENCES**

#### **Courses for Undergraduates**

ATM S 101 Survey of the Atmosphere (5) AWSp Composition and structure of earth's atmosphere; relation of earth to sun and consequent geographical temperature distribution; processes within the atmosphere that produce rain, snow, and other condensation phenomena; tropical and extratropical storms, thunder-storms, chinooks, and cold waves.

#### 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 Mathematics 124.

#### ATM S

#### 301 Introduction to Atmospheric Sciences (5) Ŵ

#### Reed

Composition and structure of the atmosphere. Solar and terrestrial radiation. Water substance and processes. Thermodynamic processes. Air and processes. In the most name processes of motions. Physical properties and processes of the upper atmosphere. Prerequisites, Mathe-matics 124 and Physics 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

Climatic characteristics in the lower layers of the atmosphere. Soil temperatures and their relation to temperatures of overlying air. Vertical temperature, moisture, wind speed, and wind direction gradients. Effects of plane, concave and convex surfaces, and vegetal covering on temperature and wind distribution. Offered jointly with the College of Forest Resources as Forest Resources 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 thermo-

### ARTS AND SCIENCES

dynamics; properties and distribution of atmospheric gases. Introduction to cloud physics. Prerequisite, Mathematics 125 or permission.

#### ATM S

#### 351 Atmospheric Observations and Analysis (5) A

Badgley, Houze, Reed, Wallace Methods of using common meteorological instruments for measuring precipitation, temperature, pressure, humidity, winds, including upper-air observations. Thermodynamic diagrams. Analysis of surface and upper-level charts and vertical cross sections. Prerequisites, one year of calculus and general physics.

# ATM S 390H Tutorial in Atmospheric Sciences (\*, max. 6) Sp

Review and discussion of selected problems in atmospheric sciences. Introduction to research methods. Presentation of a research paper. Prerequisites, Mathematics 224, Physics 123.

#### ATM S

406 Geophysics: The Atmosphere (3) Sp Structure and composition of the atmosphere, atmospheric radiation, use of meteorological data, humidity and cloud processes, structure and dynamics of large-scale weather systems. Offered jointly with the Geophysics Group as Geophysics 406. Prerequisite, 404 or permission.

#### ATM S

# 431 Atmospheric Physics (5) A

Businger

Introduction to cloud and precipitation processes with emphasis on the microphysics. Solar and terrestrial radiation, transfer processes and applications. Prerequisites, 340 or Physics 222, and Mathematics 327 or equivalent.

#### ATM S

### 432 Atmospheric Physics (3) Sp

Electromagnetic principles and application to the atmosphere, properties of waves, atmospheric probing, natural signal phenomena, radar effects of nuclear explosions. Prerequi-sites, 340 or Physics 222 or equivalent, and Mathematics 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 Mathematics 327. 442: numerical weather prediction, barotropic and baroclinic wave theory, the general circulation. Both courses include laboratory exercises. Prerequisite, 441 for 442.

#### ATM S

Atmospheric Data Analysis (5) W 450 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, Engineering 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.

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#### **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 and Snow (3) A Hobbs

Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from the vapor and liquid phases. Physical properties of snow. Offered jointly with the Geophysics Group as Geophysics 510. Prerequisite, permission.

#### ATMS

#### 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 the Geophysics Group as Geophysics 511. Prerequisite, 510 or permission.

#### ATM S

#### 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 the Geophysics Group as Geophysics 512. Prerequisites, 510, 511, or permission.

#### ATM S

#### 513 Glaciology III: Structural Glaciology (3) A

#### Raymond, Untersteiner

Snow metamorphism and primary layering. Dynamic metamorphism, flow structures, and relation to ice deformation. Structure of river, lake, and sea ice. The role and behavior of foreign matter. Physical processes of structural change and relationship between structures and bulk physical properties. Offered jointly with the Geophysics Group as Geophysics 513. Prerequisites, 510, 511, 512, or permission.

#### ATM S

514 Field Glaciology (6) Sp LaChapelle

Structure and metamorphism of snow cover. Energy exchange at melting snow and ice surfaces. Deformation and flow of glaciers. Climatology and mass budgets. Glacier features. Emphasis on instrumentation, field techniques, and data analysis. Offered jointly with the Geophysics Group as Geophysics 514. Prerequisite, 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 (\*) AWSp 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 the Department of Civil Engineering as CEWA 525. Prerequisite, 301 or permission.

#### ATM S

526 Seminar in Glaciology (\*) AWSp Untersteiner

See 521 for course description.

#### ATM S

531 Structure of the Upper Atmosphere (3) A Leovy

Structure, composition, and dominant physical and photochemical processes. Sound propagation, aurora, air glow, ionosphere, and Van Allen belts. Role of the sun, planetary atmospheres. Offered jointly with the Geophysics Group as Geophysics 531. Prerequisites, Mathematics 238 and Physics 320, or permission.

#### ATM S

#### 533 Atmospheric Radiation (3) Sp Leovy

Solar spectrum. Atmospheric scattering, spectra of water vapor and other gases. Albedo of earth and atmosphere. Radiative heat balance. Prerequisites, Physics 320 and Mathematics 238. (Offered alternate years; offered 1974-75.)

#### ATM S

#### 534 Weather Sensing by Satellites (3) Sp 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. (Offered alternate years; offered 1974-75.)

#### 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) Leovy

Properties of the ionosphere, electromagnetic wave propagation, the dynamics of the ionosphere. Offered jointly with the Geophysics Group as Geophysics 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, Mathematics 328, Aeronautics and Astronautics 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

543: perturbation equations in Eulerian and Lagrangian form, simple wave motions in incompressible and compressible fluids, linear baroclinic instability, the equations of motion in spectral form, nonlinear interactions, laborabaroclinic instability, 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

#### 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, max. 10) WSp

Reed, Wallace

Selected advanced nonroutine types of anal-

ysis. Exercises in objective map analysis and numerical weather prediction. Prerequisite, 442 or permission.

#### ATM S

# 560 Theory of Meteorological Instruments (3)

#### Badgley, Businger

Physical theory of operation of meteorological instruments. New and specialized research instruments and more difficult problems in-volving standard instruments. Prerequisites, one year of calculus and permission.

#### ATM S

#### 580 Atmospheric Photochemistry and **Chemical Kinetics (3) Sp**

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

of controlled-model experiments in Role 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 Zoology.

# **Courses for Undergraduates**

#### BIOL

#### 100 Introductory Biology (5) AWSpS

Introduction to biological principles and concepts, and the application of biological knowledge to problems of man and society; development of an awareness to science as process. Offered principally by the departments of Botany, Genetics, and Zoology. Emphasis is determined by staff member offering course.

#### BIOL

#### 101-102 General Biology (5-5) A,W Fernald, Kruckeberg, Meeuse, Orians, Osterud

Principles of living systems as viewed at levels from the subcellular to the community. Emphasis on structural and functional analysis of biological organization—its adaptedness, its genetic diversity, its energetics-leading to an evolutionary synthesis. The position of man in the biological world. For nonmajors and teaching majors in biology. Credit is not given for 101-102 if any two of the following courses, or their equivalents, have previously been taken: Zoology 111-112; Botany 111, 112.

#### BIOL

103 Introduction to Biology (5) ASp Piternick

Introduction to basic biological concepts within the context of human biology. Pri-marily for students in the Educational Opportunity Program. Prerequisite, permission.

#### BIOL

104 Biology for Elementary School Teachers (5) WSp

#### Piternick

Laboratory-based course dealing with basic concepts of biology. Emphasis on background needed for confident use of new science curriculum materials in the elementary school. Prerequisite, permission.

#### BIOL

#### 210, 211, 212 Introductory Biology (5,5,5) AW,WSp,SpA

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 col-lege chemistry or permission.

#### BIOL

401 Cell Biology (3) Whiteley

Structure and function of the cell. Prerequisites, Zoology 301, Genetics 451, or permission.

# BIOL

402 Cell Biology Laboratory (2) Whiteley

Prerequisites, 401, which must be taken concurrently, and permission.

#### BIOL

454 Evolutionary Mechanisms (3) Kruckeberg

Evolutionary change as determined by mutation, recombination, and selection. Effects of the genetic system, isolating mechanisms, hybridization, and 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, Genetics 451 or equivalent. (Offered alternate years; offered 1974-75.)

#### BIOL

472 Principles of Ecology (3)

Del Moral, Edmondson, Orians Population biology, interactions between or-ganisms 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 col-lege chemistry, and upper-division standing.

#### BIOL

#### 474 Ecology Laboratory (3) Edmondson

Prerequisites, 472 and permission. Students may be required to share a portion of the transportation costs of field trips.

#### BIOL

#### 475 Limnology Laboratory (2)

Edmondson Examination of biota of fresh waters, survey of limnological methods, and analysis of data. Prerequisites, 473 and permission.

#### **Courses for Graduates Only**

#### BIOL

501 Advanced Cytology (5) Detailed study of the structure and function of the cell. Prerequisite, permission.

#### BIOL

#### Cellular Physiology (3) 508 Whiteley

The cell membrane and permeability, cyto-plasmic physiology, intracellular energetics and biosynthesis, physiology of cell division, cell movement. (Biology 508 and 509 may be elected separately, or in either sequence.) Prerequisite, 401 or permission.

#### BIOL

#### 509 Cellular Physiology (3) Whiteley

Chemistry and physiology of the interkinetic and dividing nucleus, nucleocytoplasmic inter-actions, physiology of differentiated cells. (Bi-ology 508 and 509 may be elected separately, or in either sequence.) Prerequisite, permission.

#### BIOL

#### Cellular Physiology Laboratory (2) 510 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 Stuiver

Current limnological problems; among others, the sulfur, carbon, and nitrogen cycles, sedimentation rates, and temperature determinations. Some emphasis on the use of isotopes. Prerequisite, 473 or permission.

#### BIOL

586 Analysis of Development (3) A Analysis of structural, physiological, and molecular levels of developmental processes including gametogenesis, fertilization, cell and tissue movements, induction, and cytodifferentiation. Prerequisites, Zoology 456 and Biochemistry 442, or permission.

#### BIOL

# 587 Analysis of Development Laboratory (1-5, max. 5) WSp

Series of intensive workshops in develop-mental biology, each extending over seven to ten days. Each is based on problems under study in the laboratory of the instructors in-

# ARTS AND SCIENCES

volved, using materials, methods, and approaches characteristic of that laboratory. Prerequisites, 586 and permission.

591 Problems in Biological Instruction (1) Seminar in biological instruction; teaching techniques, course and curricula planning.

### BOTANY

#### **Courses for Undergraduates**

Students may be required to pay part of the transportation costs of field trips for the fol-owing courses: 113, 313, 331, 421, 443, 446, 447, 451, 454, 551, 462, 464.

#### BOT

#### 110 Plants in Man's Environment (5) AWSpS Blaser, Stuntz, Walker

Basic course on plants, emphasizing the diversity of organisms, the economic importance of plants, and the function of plants in vegetation systems and human communities. For nonmajors.

#### BOT

#### 113 Elementary Plant Classification (5) Sp Denton

Introduction to plant classification; field study and laboratory identification of the common plant families and the conspicuous flora of western and central Washington. Two full-day field trips required of all students.

#### BOT

#### 220 The Plant Kingdom (5) WSp

Blaser, Haskins, Waaland Introduction to the major groups of the plant kingdom. Structure and reproduction and the theories of evolutionary relationships of the phyla are considered. Prerequisites, Biology 101-102 or equivalent.

#### BOT

#### 301 Plant Propagation (2) AWSp Nishitani

Practical course in methods of plant propagation by seeds, cuttings, building, layering, bulbs, divisions, and other special structures. Includes consideration of care and handling of plants in the home, garden, and greenhouse. Not open to students who have taken 201, 202, 203. Prerequisites, Biology 101-102 or equivalent.

#### BOT

### 313 Introductory Taxonomy (5) A

Principles of classification; rules of nomenclature; botanical exploration (western North America). Field and laboratory study of Washington flora, concentrating on largest and most important groups, especially grasses, and the sunflower family. Not open to students who have taken 113. Prerequisites, 10 credits in biological science or junior standing, and permission. (Offered on demand.)

#### BOT

#### 331 Ornamental Plants (3) Sp Kruckeberg

Identification, recognition, and use of culti-vated 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 (3) 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. Biology 212 or 101-102, and Chemistry 102, or permission.

#### BOT

#### 421 Bryology (3)

Taxonomy of the mosses, with emphasis on the moss flora of the Pacific Northwest. Intensive practice in identification of mosses in laboratory. Field study for collections, recognition, and natural history of mosses. For undergraduate and graduate majors in botany and related fields. (Offered upon demand.)

#### BOT

#### 433 Advanced Systematics (5) A Denton

Taxonomic theory and practice; nomenclature; classification systems, historical and modern; individual project required. Prerequisites, 113 and permission. (Offered altér-nate years; offered 1975-76.)

BOT

#### 434 Advanced Systematics (5) W Denton

Taxonomic theory and practice; nomenclature; classification systems, historical and modern; individual project required. Pre-requisites, 113 and permission. (Offered alternate years; offered 1975-76.)

#### BOT

443 Freshwater Algae (5) A Morphology, life histories, systematics, and ecology of freshwater algae, with emphasis on the local flora. Opportunities provided for stu-dents to learn basic cytological, morphological, and physiological characteristics of the freshwater algae. Studies are made on algae collected in the field and on specimens grown in laboratory culture. Students are given the opportunity to isolate and grow laboratory cultures of certain local algae. Prerequisite, 220 or permission. (Offered alternate years; 'offered 1974-75.)

#### BOT

#### 444 Plant Anatomy (5) A Blaser

Study of the origin and differentiation of tissue systems; practice in interpretation of histology of plant materials. Prerequisite, Biology 101-102 or 212. (Offered alternate years; offered 1974-75.)

#### BOT

#### 445 Marine Botany (7) 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, con-current registration in Zoology 430, and permission.

BOT

#### 446 Algology (5) Sp Waaland

Examination of algal phyla from the viewpoint of morphological and physiological characteristics important to their systematics. Points emphasized are: phylogeny of various lines of evolution in algae, relationships between algae and other parts of plant and animal kingdoms, algal geography and species of economic importance. Prerequisite, 220 or 311, or 20 credits in biology.

#### BOT

#### 447 Phytoplankton Morphology and Taxonomy (5) A

Advanced discussion of phytoplankton morphology with emphasis on characteristics important to their taxonomy. Emphasis placed on cytology of the organisms, their life his-tories, adaptive morphological characteristics, and isolation and culture of phytoplankton organisms. Prerequisite, 445 or 446, or per-mission. (Offered alternate years; offered 1975-76.)

BOT

#### Marine Algal Ecology (3) A 448 Waaland

The marine environment in relation to the distribution of marine algae, zonation of benthic algae, interactions of algae and animals and the biological basis for phycogeography. Prerequisite, 445 or 446, or permission. (Offered alternate years; offered 1975-76.)

#### BOT

#### 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

#### 454 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. Prerequisite, 113 or 313, Biology 472, or permission.

## BOT

#### 462 Basidiomycetes (5) A Stuntz

Structure and classification of the basidiomycetes. Prerequisite, 360 or permission.

# ROT

Phycomycetes and Related Fungi (5) A Whisler

Life history, development, taxonomy, and physiology of slime molds and phycomycetes. Prerequisites, 360, Microbiology 400, or permission. (Offered alternate years; offered 1974-75.)

#### BOT 464 Ascomycetes (5) Sp

Stuntz Structure and classification of the ascomycetes. Prerequisite, 360 or permission. (Offered alternate years; offered 1974-75.)

#### 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

Development in Lower Plants (5) W 469 Whisler

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. Prerequisite, 220 or permission. (Offered alternate years; offered 1974-75.)

#### 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, Biology 101-102, or 212, and completion of, or concurrent registration in, Chemistry 232, 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. Pre-requisite, 371 or 472, or equivalent. (Offered alternate years; offered 1974-75.)

#### BOT

#### 478 Plant Morphogenesis (3) Sp Halperin

Course progresses from a general review of the subcellular 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. Prerequisites. Biology 212 or Botany 371 or equivalents. (Offered alternate years; offered 1975-76.)

#### BOT

#### Plant Morphogenesis Laboratory (2) Sp 479 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.

ROT

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

Blaser, Denton, Kruckeberg Current research and trends in morphology and taxonomy of higher plants. Comparison of classical with modern approaches and concepts. Prerequisite, permission.

#### BOT

#### 523 Selected Topics in Mycology (2, max. 10) AWSD

Stuntz, Whisler

Selected topics from all phases of mycology. Prerequisite, permission.

#### 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, deposition in sediments, and paleoecology. Prerequisite, permission.

#### BOT

#### Marine Algology (6) S Norris, Waaland 545

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 Laborato-ries bulletin for the year offered.

#### BOT

### Advanced Algology (6) S Norris, Waaland 549

Very rich and varied marine algal flora of the region are studied, with emphasis on the experimental approach to ecological, developmental, physiological, and systematics problems, using local species. Opportunities for developing individual research problems. Offered at Friday Harbor Laboratories. Prerequisite, 545 or equivalent.

#### BOT

#### 551 Field Ecology (3) Sp Del Moral

Field studies of ecological processes and emergent ecosystem properties. Emphasis is on the significance of changes that occur during ecosystem development. Current ecological dogma tested under field conditions. Prerequisite, 450, which may be taken concurrently, or any ecology course beyond Biology 472; qualified seniors admitted by permission and petition to the Graduate School. (Offered alternate years; offered 1975-76.)

BOT

### 565 Marine Mycology (6) S

Whisler

Taxonomy and morphology of aquatic fungi with emphasis on marine forms, collection, and culture methods. Prerequisite, 220 or 360 or 20 credits in biology. Consult Friday Harbor Laboratories bulletin for the year offered.

#### BOT

#### 570 Plant Metabolism (3) W

Meeuse

Metabolism of organic compounds, with emphasis on photosynthesis and cellular respiration. Prerequisites, 472, and Chemistry 232 or equivalent, and permission. (Offered alternate years; offered 1974-75.)

#### BOT

#### 571 Plant Metabolism Laboratory (2) W 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 1975-76.)

#### BOT

#### 573 Water Relations Laboratory (2) Sp Walker

Prerequisite, concurrent registration in 572. (Offered alternate years; offered 1975-76.)

#### 575 Problems in Algal Physiology (6) S

Metabolic activity of the algae. Prerequisites, 472 or 371, Chemistry 232, and permission. Consult Friday Harbor Laboratories bulletin for the year offered.

#### BOT

#### 577 Plant Growth and Development (3) Sp Cleland

Control of growth, development, and differen-tiation in higher plants. Prerequisite, 472 or permission. (Offered alternate years; offered 1974-75.)

#### BOT

#### 578 Plant Growth and Development Laboratory (2) Sp

Cleland

Experimental methods for studying plant growth and development. Must be accompanied by 577.

#### BOT

#### 579 . Environmental Control of Plant Growth and Development (3) W Cleland

Effects of environment, light, temperature extremes, and water stress on the growth, development, and metabolism of plants. Prerequisite, 371 or 472. (Offered alternate years; offered 1975-76.)

#### BOT

600 Independent Study or Research (\*) AWSp

BOT

700 Master's Thesis (\*) AWSp

#### BOT

800 Doctoral Dissertation (\*)

#### CHEMISTRY

#### **Courses for Undergraduates**

#### CHEM

#### 100 Chemical Science (5) SpS

Terminal survey course for nonscience majors. Not to be considered as a preparation for other chemistry courses. No credit given to those who have taken one unit or more of high school chemistry.

#### CHEM

#### 101 General Chemistry (5) 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 qualifying examination.

#### CHEM

105 Introduction to General Chemistry (3) A For students without a full year of high school chemistry who plan to take 140 or 145. Basic introduction to chemistry for physical science, biological science, premedical, engineering ma-jors who intend to take a year or more of college chemistry. Emphasis on quantitative reasoning. For students with high school chemistry, not more than 5 credits allowed from among 105, 101, and 140 or 145. (Last time offered: Summer Quarter 1975.)

#### CHEM

#### 140 General Chemistry (4) 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 or Chemistry 101 or 105 and qualification for Mathematics 105.

#### CHEM

#### 145 General Chemistry (4) A

Parallels 140. For science, engineering, and other majors who plan to continue their study of chemistry through physical chemistry. Assumes strong high school background in chemistry, or 105 and good aptitude for study of science.

#### CHEM

#### 147H General Chemistry Honors Laboratory (3) W

Introduction to quantitative chemistry. Prerequisite, 150 or 155 concurrently and per-mission. 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.

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#### 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 (170 may be taken concurrently with 160).

#### 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

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 chemistry, Physics 116, and Mathematics 125 or 157.

#### CHEM

**351 Elementary Physical Chemistry (3) SpS** Continuation of 350. Prerequisite, 350.

#### CHEM

401 Principles of Chemistry (3, max. 6) S Primarily for high school teachers. Principles of chemistry, atomic and molecular nature of matter, periodic system, stoichiometry, chemical reactions, modern terminology and nomenclature.

#### CHEM

# 402 Techniques of Chemistry (2 credits in a given quarter or 3 credits in a given quarter) S<sub>1</sub> Primarily for high school teachers. Discussion

Primarily for high school teachers. Discussion and demonstration of fundamental techniques, determination of composition and structure, analysis and synthesis, separation and purification processes, electrochemical processes, use of stable and radioactive isotopes.

#### CHEM

410, 410H Radiochemical Techniques and Radioactivity Measurements (3) Sp

Introductory general service course for students planning further work in nuclear or tracer applications. Safety procedures, detection and measurement of nuclear radiations, radiochemical and tracer techniques. Prerequisites, 150 or 155, Mathematics 124 and Physics 116, or permission.

### CHEM

#### 414 Chemistry of the Main Group Elements (3) A

The elements and their compounds in relation to the periodic system. Prerequisite, senior standing; 351 or 457 recommended.

#### CHEM

#### 415 The Chemical Bond (3) W

The nature of the chemical bond. Prerequisite, 455.

#### CHEM

#### 416 Chemistry of the Transition Metal Elements (3) W

Prerequisite, senior standing; 457 or 351 recommended.

#### CHEM

#### 418 Radiochemistry (3) W

Natural radioactivity, nuclear systematics and reactions, radioactive decay processes, decay laws, statistical considerations, applications of radioactivity. Prerequisite, 455 or permission.

#### CHEM

#### 426 Instrumental Analysis (3) Sp

Introduction to electrical and optical methods of analysis. Prerequisite, 221 or 157H.

#### CHEM

427 Advanced Quantitative Theory (3) A Principles of analytical chemistry. Prerequisites, 221 or 157H, 232 or 236 or 337, and 457, or permission.

#### CHEM

455, 455H Physical Chemistry (3) AWS Introduction to quantum chemistry, statistical mechanics, kinetic theory of gases. Prerequisites, 150 or 155, Mathematics 126, and college physics.

#### CHEM

**456, 456H** Physical Chemistry (3) AWS Thermodynamics, phase equilibria, colligative properties of solutions, electrolytes, and electrochemistry. Prerequisites, 150 or 155, Mathematics 126, and college physics.

#### CHEM

**457, 457H** Physical Chemistry (3) Sp Chemical kinetics, transport properties, molecular structure, the solid state, surfaces, and macromolecules. Prerequisites, 455 and 456.

#### CHEM

#### 460 Physical Measurements in Chemistry (4) ASp

Observation and interpretation of infrared, ultraviolet, NMR, and mass spectra with emphasis on the determination of structure of polyatomic molecules. Noise rejection and small signal problems, statistics, feedback and control, data processing, and design of experiments. Prerequisites, two quarters of organic chemistry, 350 or 455 or 456, which may be taken concurrently, or permission.

#### CHEM

461 Physical Chemistry Laboratory (2-3) AWSp

Physical measurements in chemistry. Vacuum and high-temperature techniques, calorimetry, spectroscopic methods, electrical measurements. Prerequisites, 455, 457 or 351, or permission; 460 is recommended.

#### CHEM

#### 462 Techniques of Synthetic Chemistry (2-3) ASp

Techniques of synthetic chemistry with examples from organic, inorganic, and biological chemistry. Vacuum line synthesis, low- and high-temperature techniques, high-pressure syntheses, photochemical reactions, radiochemical synthesis, gas phase reactions, etc. Chromatography and separation techniques. Prerequisite, 347H or 242, or permission.

#### CHEM

#### 463 Separations and Analysis (2-3) AWSp

Techniques of spectroscopic analysis of structure UV, IR, NMR, mass spectroscopy. Prerequisite, 460, which may be taken concurrently.

#### CHEM

#### 498 Teaching Experience in Chemistry (1, max. 6) AWSp

Students are trained as assistants in laboratories and quiz sections. For chemistry majors, especially those planning graduate work. Prerequisites, permission, grade-point average above 3.00, and upper-division standing.

#### СНЕМ

#### 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 (2, max. 12) 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; not offered 1974-75.)

#### CHEM

#### 530 Advanced Organic Chemistry (3) A

Electronic mechanisms in organic chemistry. An introduction to the theory of organic reactions. Prerequisite, 337 or equivalent.

#### CHEM

# 531 Advanced Organic Chemistry (3) W

Discussion of the principal reactions of synthetic organic chemistry, with emphasis on practical methods. Transformation of functional groups. Prerequisite, 530 or permission.

#### CHEM

#### 532 Advanced Organic Chemistry (3) Sp Kinetics and equilibria as related to the mechanisms of organic reactions. Absolute rate theory. Stereochemistry and the 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.

For doctoral candidates in organic chemistry. Discussions of topics of current interest and importance. See the department for instructor and topic during any particular quarter.

#### CHEM

#### 550 Introduction to Quantum Chemistry (3) A Origins and basic postulates of quantum mechanics; solutions to single particle problems; angular momentum and hydrogenic wave functions; matrix methods; perturbation theory; variational methods. Prerequisite, 455 or permission.

#### CHEM

#### 551 Introduction to Quantum Chemistry (3) Sp

Electronic structure of many electron atoms and molecules; vibration and rotation levels of molecules; effects of particle exchange;

angular momentum and group theory; spec-troscopic 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 equiva-lent for 552; 552 for 553.

#### CHEM

559 Chemical Kinetics (3) Sp

Modern experimental methods and fundamental theories of reaction rates. Role of vibrational excitation in unimolecular and 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 marter.

#### 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

Seminar in Physical Chemistry (1, max. 595 18) AWSpS

CHEM 600 Independent Study or Research (\*) AWSpS

CHEM

700 Master's Thesis (\*) AWSpS

CHEM 800 Doctoral Dissertation (\*)

#### 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) A,W

Intensive introduction to Attic Greek. Not accepted as upper-division credit toward a major in Greek or Classics. Prerequisites, for 300, junior standing and permission; 300 for 301.

#### GRK

310, 311, 312 Advanced Grammar and Composition (1,1,1) A,W,Sp Prerequisite, 208.

#### GRK

401-402-403 Elementary Modern Greek (5-5-5) S Èdmonson

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

The Pre-Socratic Philosophers (3) A 413 **McDiarmid** 

(Offered alternate years; offered 1974-75.)

306

GRK 414

- Plato (3) W MacKay (Offered alternate years; offered 1974-75.)
- GRK 415 Aristotle (3) Sp
- MacKay

(Offered alternate years; offered 1974-75.)

GRK

#### 422 Herodotus and the Persian Wars (3) A Bliquez (Offered alternate years; offered 1975-76.)

GRK

424 Thucydides and the Peleponnesian War (3) W Bliquez

(Offered alternate years; offered 1975-76.)

#### GRK

426 Attic Orators (3) Sp

Bliquez (Offered alternate years; offered 1975-76.)

#### GRK

442, 443, 444 Greek Drama (3,3,3) A,W,Sp **McDiarmid** 

(Offered alternate years; offered 1975-76.)

GRK

449 Greek Epic (3) A Roth

(Offered alternate years; offered 1974-75.)

GRK

451 Lyric Poetry (3) W Grummel

(Offered alternate years; offered 1974-75.)

#### GRK

#### 453 Pindar: The Epinician Odes (3) Sp **McDiarmid**

(Offered alternate years; offered 1974-75.)

#### 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

ture.

LAT

LAT

#### LAT 101, 102, 103 Elementary Latin (5,5,5) A,W,Sp

101, 102: an intensive study of grammar, with

reading and writing of simple Latin prose; 103:

reading of selections from classical Latin litera-

201 Intermediate Latin: Introduction to Latin

Readings in prose and poetry from various Latin authors. Prerequisite, two years of high school Latin or 103.

202 Intermediate Latin: Cicero and Ovid (3)

Readings from the orations of Cicero and the

elegiac verse of Ovid. Prerequisite, 201.

Grummel

Literature (3) A

Pascal

w

Pascal



203 Intermediate Latin: Vergil (3) Sp Selections from the first six books of the Aeneid. Prerequisite, 202.

#### LAT

#### 206, 207, 208 Grammar and Composition (2,2,2) A,W,Sp

Systematic review of Latin vocabulary, forms, and grammatical principles; exercises in prose composition. To be taken concurrently with 201, 202, and 203. Prerequisites, two years of high school Latin or 103; 206 for 207; 207 for 208.

#### LAT

#### 300, 301 Latin Language, Accelerated (3,3) A,W

Intensive introduction to classical Latin. Not accepted as upper-division credit toward a major in Latin or Classics. Prerequisites, for 300, junior standing and permission; 300 for 301.

#### 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: Re-public. 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 1975-76.)

### LAT

Cicero's Philosophical Works (3) W 413 Grummel

(Offered alternate years; offered 1975-76.)

#### LAT

414 Seneca (3) Sp

Grummel (Offered alternate years; offered 1975-76.)

#### LAT

422 Livy (3) A

Vignoli (Offered alternate years; offered 1974-75.)

#### LAT

423 Cicero and Sallust (3) W (Offered alternate years; offered 1974-75.)

#### LAT

424 Tacitus (3) Sp Harmon

(Offered alternate years; offered 1974-75.)

Roman Lyric (3) A Vignoli

(Offered alternate years; offered 1975-76.)

### LAT

#### Roman Elegy (3) W 449 Harmon

(Offered alternate years; offered 1975-76.)

#### LAT

451 Roman Satire (3) Sp Vignoli

(Offered alternate years; offered 1975-76.)

LAT

457 Roman Drama (3) A Pascal

(Offered alternate years; offered 1974-75.)

#### LAT

458 Roman Epic (3) W

### Grummel

(Offered alternate years: offered 1974-75.)

#### LAT

459 Roman Pastoral (3) Sp Grummel

(Offered alternate years; offered 1974-75.)

475 Improvement of Teaching: Latin (3) S Examination and evaluation of the various methods of teaching Latin; and audiovisual aids; testing materials; textbooks; relation of Latin to other languages; Latin derivatives in English vocabulary. Offered jointly with the College of Education as EDC&I 438.

#### LAT

476 Caesar for High School Teachers (3) S Interpretation of Caesar's works in the light of their historical, political, literary, and geographical background, with special reference to the problems of high school teaching. Offered jointly with the College of Education as EDC&I 439.

#### LAT

490, 490H Supervised Study (\*, max. 18) 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

#### 210 Greek and Roman Classics in English (5) AWSp

Bliquez, 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)

#### Bliquez

Study of the civic, religious, and social practices and institutions of everyday Greek and Roman private and public life, including the family, social classes, the courts and legal systems, religion and cult, military service and war, technology and the trades, money and banking, agriculture and rural life. Many lectures illustrated by slides.

307

#### 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 Vienoli

Study of the Iliad, the Odyssey, the Aeneid, and selections from other ancient 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. Menander, 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, Lon-ginus, and other major classical authors. Attention is given to their influence on modern literary critics.

445 Greek and Roman Religion and Cult

Study of the religious life of the Greeks and

the Romans, with emphasis upon cults, festi-

vals, the priesthoods, sacrificial rites, and the

ecstatic and mystic movements. Attention is given

to personal piety, rituals of purification and healing, pagan regeneration, concepts of life beyond death, magic, astrology, and the con-flict of religions in the Roman Empire. Illus-

340 Pre-Classical Art and Archaeology (3) A

Survey of the art and the other material re-

mains 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, il-

lustrated by slides. The history, techniques, and

results of significant excavations are examined.

CLASSICAL ARCHAEOLOGY

#### CLAS

(3) A Harmon

trated by slides.

Edmonson

CL AR



#### CL AR

341 Greek Art and Archaeology (3) W Bliquez, Edmonson

Survey of the material remains and the developing styles in sculpture, vase painting, architecture, and the minor arts from the geometric to the Hellenistic periods, illustrated by slides. Principal sites and monuments, as well as techniques and methods of excavation, are examined in an attempt to reconstruct the material culture of antiquity. Offered jointly with the School of Art as ART H 341.

#### **CL AR**

342 Roman Art and Archaeology (3) Sp Pascal, Vignoli

Roman architecture, painting, and sculpture, with emphasis on the innovations of the Romans in these areas, illustrated by slides. Offered jointly with the School of Art as ART H 342.

#### CL AR

#### 442 Greek and Roman Pottery (3) A Edmonson

Shapes, fabrics, and decorations from the Neolithic period to the sixth century A.D. Offered jointly with the School of Art as ART H 442. (Offered alternate years; offered 1974-75.)

#### CL AR

444 Greek and Roman Sculpture (3) W Edmonson

History and development of Greek sculpture and sculptors, their Roman copyists, and Roman portraits and sarcophagi. Emphasis on Greek sculpture of the fifth century B.C. Offered jointly with the School of Art as ART H 444. (Offered alternate years; offered 1974-75.)

#### CL AR

446 Greek Architecture (3) Sp Edmonson

Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. (Offered alternate years; offered 1974-75.)

#### **Courses for Graduates Only**

CLASSICS

CLAS 700 Master's Thesis (\*)

CLAS 800 Doctoral Dissertation (\*)

#### GREEK

#### GRK

Seminar (3, max. 27) AWSp 520 Bliquez, Edmonson, MacKay, McDiarmid, Roth

The courses numbered 580-589 are graduate reading courses. In them, students read extensively in texts appearing on the Ph.D. Greek reading list.

#### GRK

580 Greek Tragedy (3) A (Offered alternate years; offered 1974-75.)

#### GRK

582 Herodotus and Thucydides (3) W (Offered alternate years; offered 1974-75.)

#### GRK

584 Plutarch, Xenophon, Demosthenes (3) Sp (Offered alternate years; offered 1974-75.)

GRK

585 Plato, "Republic" (3) A (Offered alternate years; offered 1975-76.)

GRK 587 Aristotle, Politics or Ethics (3) W (Offered alternate years; offered 1975-76.)

#### GRK

589 Aristophanes (3) Sp (Offered alternate years; offered 1975-76.)

GRK 590 Supervised Study (\*, max. 18) WSp

#### GRK

600 Independent Study or Research (\*) AWSp

#### LATIN

LAT

520 Seminar (3, max. 27) AWSp Grummel, Harmon, Pascal, Vignoli

The courses numbered 580-589 are graduate reading courses. In them, students read extensively in texts appearing on the Ph.D. Latin reading list.

LAT 580 Roman Rhetoric (3) A (Offered alternate years; offered 1974-75.)

LAT 582 Augustan Poetry (3) W (Offered alternate years; offered 1974-75.)

584 Survey of Latin Poetry (3) Sp (Offered alternate years; offered 1974-75.)

#### LAT

585 The Civil War: Caesar, Cicero, Lucan (3)

(Offered alternate years; offered 1975-76.)

#### LAT

587 Roman Comedy, Menander, and Petronius (3) W

(Offered alternate years; offered 1975-76.)

LAT 589 Prose of the Roman Empire (3) Sp 1975-76

(Offered alternate years; offered 1975-76.)

LAT 590 Supervised Study (\*, max. 18) AWSp

#### LAT

600 Independent Study or Research (\*) AWSp

#### CLASSICAL ARCHAEOLOGY

#### CL AR

511 Mycenaean Archaeology (3) A Edmonson

The art, architecture, and culture of Greece in the late Bronze Age, with emphasis on recent archaeological and linguistic discoveries. (Offered alternate years; offered 1975-76.)

#### CL AR

Athenian Topography (3) W 513

Edmonson Detailed consideration of the topography and

308

monuments of ancient Athens from the beginning through the Roman period. (Offered alternate years; offered 1975-76.)

#### CL AR

#### 515 Attic Epigraphy (3) Sp Edmonson

Study of Athenian inscriptions with emphasis on their historical value. The classification and editing of inscriptions, epigraphical techniques, and special problems are treated in detail. (Offered alternate years; offered 1975-76.)

#### CLASSICAL LINGUISTICS

**CL LI** 

#### 501 Comparative Phonology of Greek and Latin (3)

Phonological developments of Greek and Latin from Indo-European to the classical periods of both languages.

#### **CL LI**

#### 503 History of the Greek Language (3) Roth

Morphological and syntactical development of the Greek language from Homer through the New Testament; the development of prose and poetic style.

**CL LI** 

#### 505 History of the Latin Language (3) Roth

Morphological and syntactical development of the Latin language; the development of Latin as a literary language.

**CL LI** 

### 506 Italic Dialects (3)

Roth 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)

tion. Open to nonmajors.

201 Communications Today (3)

Ames, Pember, Samuelson, Simpson Yerxa

Organization, operation, and control of the mass media in America; social functions of mass communication; characteristics of media audiences. Open to nonmajors.

Examination of the functions of communica-

Elementary course in the communications process and a survey of contributions of the

various disciplines as applied to mass media,

news, advertising, and editorial interpretations.

#### CMU

CMU

#### 200 The Communication Process (5) Bowen, Dervin, Samuelson, Stamm



A critical study of language use. Open only to nonmajors.

### CMU

### 202 History of the Press in America (3)

Study of the men and ideas that shaped the development of the press in America. Open only to nonmajors.

#### CMU

203 The Press in Contemporary America (3) Study of responsibility of the mass media in relation to the political and economic spheres of society. Special emphasis on ethics of journalism. Open only to nonmajors.

#### CMU

#### 220 Intercultural Communication (5) A Bowen, Fitchen

Introduction for undergraduate students to problems of communicating across cultures and subcultures. Study of cross-cultural communication in terms of specialized coding techniques, modes of self-perception, and symbolic representation of values. Examination of pragmatic situations of cross-cultural communication.

#### CMU

#### 226 Introduction to Advertising (3)

Economic and social aspects; organizational structure; comparison of major media; and the elements of creating and producing advertising. Open only to nonmajors.

#### CMU

#### 250 Survey of Radio and Television (3) Godfrey

History of the media, organization and regulation of the industry, commercial aspects, educational use, programming. Open only to nonmajors.

#### JOURNALISM

#### CMU

#### 291 Photography (3) Conrad

Elementary news photography, photo processing, and picture editing. Prerequisite, 150. Open only to majors.

#### CMU

314 The Role of the Magazine in America (3) Significance of specialized periodicals as vehicles of popular expression. Open to nonmajors.

#### CMU

#### 316 Contemporary Affairs (3) Yerxa

Background and significance of international, national, and local newsworthy events. Primarily a discussion course. Open to nonmajors.

#### CMU

#### 320 Legal Aspects of Communications (5) Pember, Simpson

Regulations governing publications in the mass media. Open to nonmajors.

#### CMU

### 321 News Writing (4) AWSp

Ames, Johnston, Pember, Simpson, Yerxa Structure of news and feature stories. Prerequisites, 150, 200, 320, and reasonable proficiency in the use of the typewriter. Open to nonmajors by permission.

#### CMU

### 322 Reporting (4) AWSp

Shadel, Simpson, Yerxa Reporting of contemporary news scene with special emphasis on national affairs. Open only to majors. Prerequisite, 321.

#### CMU

323 Special Reporting Topics (4, max. 12) Application of reporting techniques to specialized areas of news coverage. Section of course may focus on science, legislative news, minority affairs, or another topic. Communications advising office may be consulted for schedule of topical offerings for each quarter. Open only to majors. Prerequisite, 322.

#### CMU

324 Critical Writing for the Mass Media (4) 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

Decision making in the newsroom. An analysis of criteria for selection and display of news. Training in the making of editorial judgments, writing of headlines, editing of copy, handling of photos, and dummying of pages. Open only to majors. Prerequisite, 321.

#### CMU

326 Magazine Article Writing (3) Daniel

Nonfiction writing for national magazines and specialized publications. Prerequisite, permission. Open to nonmajors.

#### CMU

#### 327 Legislative Reporting (12) W Johnston

Full-time coverage of 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, Political Science 482, and permission.

#### CMU

#### 328 Reporting Minority Affairs (3) W Holifield

Problems in advanced reporting designed to communicate minority views to the larger society. Open to nonmajors.

#### CMU

#### 329 Reporting Minority Affairs Laboratory (2) W

Newswriting laboratory in problems of advanced reporting designed to communicate minority views to the larger society. Must be taken concurrently with 328. Open to nonmajors. Prerequisite, 321.

#### **PUBLIC RELATIONS**

#### CMU

338 Public Relations (3)

Principles and practice of public relations in business, industry, government, and social agencies, policies and conduct as fundamentals in good business relationships. Open to nonmajors.

#### CMU

339 Problems in Public Relations (3) Group application of principles to the field problems of local business or agencies, with reports and recommendations. Prerequisite, 338. Open to nonmajors.

#### **ADVERTISING**

#### CMU

#### 340 Introduction to Advertising (3) Bowen, Roller

Institutions and the major functional components of advertising. Advertising's role in the marketing mix. Open to nonmajors by permission; not open to students who have taken 226. Prerequisites, 150, 200, and Marketing 300 or permission.

#### CMU

#### 341 Advertising Copywriting (5) Bowen

Development of an appreciation and understanding of the theory and methodology of writing advertising copy for newspapers, radio, television, and direct mail. Attention is also given to copy formats required by various media as well as an understanding of the relationships between graphics and written words. Open only to majors. Prerequisite, 340.

#### CMU

#### 343 Layout and Production (3)

Theory and problems in the design and production of advertisements for printed media. Open only to majors. Prerequisite, 340 or 226.

#### CMU

#### 345 Advertising Campaigns (5) Bowen, Roller

Advanced consideration of communication problems relevant to advertising efforts. Preparation of an advertising plan for a product or a service, including objectives, strategy, and tactics for copy, media, and research. Open to nonmajors by permission. Prerequisites, 341, 346, and 348, or permission.

#### CMU

#### 346 Advertising Media Planning (3) Roller

Characteristics and evaluation of media and the writing of media plans for specific advertising campaigns. Emphasis is on the planning phase of media from a management point of view. Open only to majors. Prerequisite, 340.

#### CMU

#### 348 Advertising Research (3) Bowen

Consideration of research problems and methods of investigation relevant to advertisers; emphasis on conceptualization of advertising problems in the broader context of communication processes and effects; review of existing research sources, but special emphasis on original research. Open only to majors. Prerequisite. 340.

#### RADIO-TELEVISION AND BROADCAST JOURNALISM

#### CMU

#### 349 Radio and Television Advertising (5) Cranston

Principles of broadcast media as they apply to advertisers: planning a radio or television campaign; developing radio television commercials. Open to nonmajors by permission. Prerequisite, 340 or 370 or Marketing 411.

#### CMU

#### 353 Radio and Television News Writing (3) Wike

Gathering, writing, editing, and programming news for the broadcast media, including visual treatment for television and film. Open to nonmajors by permission. Prerequisite, 321 or 370.

#### CMU

354, 355 Television News Film Techniques (2,2) Wike

Development of skills in the use of the motion-picture camera; a study of the use of film in news and public affairs programming; emphasis on writing for film purposes and developing editorial judgment. Prerequisite, 353 or permission.

#### CMU

356, 357, 358 News Broadcasting (3,3,2) Wike

Preparation and presentation of news broadcasts; progression from editing radio news program to use of visuals and performance in television newscasts. Open only to majors. Prerequisite, 353.

#### CMU -

#### 360 Broadcasting Writing and Production (6) Broughton

Writing and production for various broadcast formats, emphasizing audio communication processes.

#### CMU

361 Television Production (5) Godfrey

Tools and crafts of production of television programs, culminating in closed-circuit presentation and recording of student-created programs subject to critical evaluation. Prerequisites, for majors, 150, 200, and permission; for nonmajors, permission.

#### CMU

#### 365 Television Workshop Laboratory (2-4, max. 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.

#### CML

371 Radio Workshop Laboratory (3, max. 6) Supervised practice in the various departments of the University's FM radio station, KUOW. Open only to majors. Prerequisites, 360 and 370.

#### CMU

#### 373 Television Writing (3)

Cranston

Principles and techniques of writing material for television production. Practice in writing programs, with consideration of camera, direction, and production problems. Open to nonmajors.

#### CMU

374 Advanced Television Writing (3) Cranston

Development of an original television script of professional production caliber. Open to nonmajors. Prerequisite, 373.

### CMU

#### 377 The Documentary (3) ASp Cranston

Historical development of the documentary. Background, aims, and creative aspects. Function of documentary in mass media. Open to nonmaiors.

#### CMU

# 379 Seminar in Broadcast Problems (3)

Broughton, Cranston, Godfrey Current problems of the broadcast industry, projected against basic legal, ethical, social, and economic principles of station operation. Open only to majors with senior standing.

# Courses for Undergraduate and Graduate Students

#### CMU

400 Communications Theory (3) 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. Prerequisite, 200 or permission.

#### CMU

#### 411 Mass Communications Research (5) Dervin

Recent developments in the study of mass communications content and audience, with emphasis on the printed media. Open to nonmajors. Prerequisite, 150 or permission.

#### CMU

#### 414 History and Communications (5) Ames, Simpson

Growth and development of the press, with emphasis on journalism in the United States, its social, political, and ethical responsibilities. Open to nonmajors. Prerequisite, 5 or more credits in American history or permission.

#### CMU

#### 443 The Social Functions of Advertising (3) Bowen

Examination of the social and economic functions of advertising as an institution in contemporary society, with special attention to controls over advertising. Emphasis is on current issues. Open to nonmajors by permission; not open to graduate students in communications. Prerequisite, 340 or equivalent.

#### CMU

#### 447 Communication and Consumer Behavior (5)

Bowen

Examination of behavioral science contributions to the understanding of consumer communication and purchasing behaviors; contributions from psychology, sociology, and anthropology. Emphasis is on the application of findings to the preparation and the placement of the advertising message. Open to nonmajors by permission. Prerequisites, 200, 340, and 348, or their equivalents.

#### CMU

# 449 Advertising Seminar (3)

Bowen, Cranston, Roller Seminar in problems and procedures in advertising, incorporating presentations by industry professionals concerning current practices. Open only to majors. Prerequisites, 345, senior standing in the advertising sequence, and permission.

#### CMU

#### 450 Broadcast Programming (3) Godfrey

Critical study of the nature, range, and structure of broadcast programming and of the forces that shape it. Open to nonmajors who have completed 250.

#### CMU -

#### 459 Television in the Schools (3)

Television programs to supplement classroom work; the development of the American system of broadcasting; the development and significance of educational television, and the contribution schools can make to broadcasting. Open to nonmajors; not open to graduate students in communications. Offered jointly with the College of Education as EDC&I 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 the College of Education as EDC&I 489.

CMU

### 470 Theory and Criticism of Broadcasting (3) Broughton, Wike

Development of social, economic, and critical standards of broadcasting and the function of radio-television in the mass communication process. Open to nonmajors. Prerequisite, 150 or 250, or permission.

#### CMU

### 473 Television Drama Production Seminar

#### (3) Cranston

Production of a professional quality television dramatic program involving writing, acting, and videotaping. Open to students who have had 373 or 361 (for writers and producers), or Drama 351, 352, 353 (for actors). Offered jointly with the School of Drama as Drama 454. Prerequisite, permission.

#### CMU

#### 474 The Educational Role of the Mass Media (21/2) S

Ames

Critical study of the role the mass media have served in providing the individual with the information necessary for fulfillment of his or her major responsibilities as a citizen, as an economic unit, as a moral force, and as a cultural entity. Open only to nonmajors.

#### CMU

### 480 Propaganda (5)

Fitchen

Propaganda involving selective information

and involuntary exposure is analyzed, using specific techniques evaluated in class. Attention is given to aspects of propaganda within the United States and in foreign and international settings.

#### CMU

#### 483 International Communication Systems (5)

Fitchen

Provides detailed study of communications patterns and institutions in foreign areas. An interdisciplinary approach is utilized, and social and personal aspects of communicating across cultures are considered together with cultural influences on the practice of jour-nalism 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 297H. Open to nonmajors; not open to graduate students in communications. Prerequisite, senior honors standing.

#### CMU

Problems of Communications 498 (1-5, max. 10) AWSpS

Research and individual study. Prerequisite, permission of Director and staff.

#### **Courses for Graduates Only**

#### CMU

500, 501 Seminar in Theory of Communication (5,5)

Carter

Major points of view-general semantics, persuasion and effects, and communication sys-tems. Examination of communication concepts in the empirical literature. Prerequisite, 400 or 508. Open to nonmajors.

#### CMU

#### 502 Seminar in Government and Mass **Communication (3)**

Pember, Simpson, Yerxa

Directed independent research into, and anal-ysis of, legal problems in mass communication, institutional and media operations. Open to nonmajors. Prerequisite, 402.

#### CMU

#### **Communication and Politics (3)** 505 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

#### **Computer Applications in** 507 **Communication Research (3)**

Stamm

Potentialities of the computer and the use of the computer in the behavioral sciences. Prerequisites, elementary programming and elementary statistics. Open to nonmajors.

#### CMU

508, 509 Communication Research (5,5) A,W

Carter, Dervin, Samuelson, Stamm Development of the rationale and methods of behavioral science in the context of communication research and theory. Open to nonmajors. Prerequisites, 508 and statistics through analysis of variance for 509.

#### CMU

511 Seminar in Communication Research (3, max. 15) 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)

Wike, Yerxa Directed individual projects in the design and organization of a complex mass communica-

tion, 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, bachelor's degree in communications or equivalent.

#### CMU

#### 570 Seminar in the Theory and Criticism of **Broadcasting (3)**

Broughton, Wike Evaluation and criticism of the function and operation of broadcasting in the mass communication process. Use of primary sources, including data gathering and analysis. Open to nonmajors. Prerequisite, 470.

#### CMU

580 Seminar in Public Opinion and Propaganda (3)

#### Fitchen

Directed reading and research in the analysis of public opinion and propaganda. Open to nonmajors. Prerequisite, 480.

#### CMU

# 581 Seminar in International

**Communications (3)** Edelstein

Analysis of public opinion and communication. Directed research in public opinion and communication. Open to nonmajors. Prerequisite, 580.

#### CMU

#### Regional Communication Systems (5) 583 Edelstein, Fitchen

Analysis of communication problems of regional economic associations, and theory of political community, and examination of empirical research on regional communication. Special emphasis is given Western Europe and the North Atlantic area. Offered alternate years with 585. Open to nonmajors. Prerequisites, 480, 485, or equivalent, or permission.

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#### CMU

#### 584 **Research Seminar in Regional Communication Systems (3)** Edelstein, Fitchen

Directed research in communication factors in regional integration in a determined region of the world. Open to nonmajors. Prerequisite, 583. (Offered alternate years with 586.)

#### CMU

#### 585, 586 Seminar in Comparative **Communication Systems (3,3) W.Sp**

Analysis and comparison of communications systems. Directed research in comparative systems and into the role of communications in national development. Prerequisite, 485. Open to nonmajors. (Offered alternate years with 583, 584.)

#### CMU

#### 597 Practicum in Communication Research (1-5, max. 10)

Individual participation by a qualified graduate student in an ongoing research project under the direction of a faculty member. Prerequisites, 501, 509.

#### CMU

#### 598 Selected Readings (1-5, max. 10)

Open to qualified graduate students by permission of Director and staff.

#### CMU

600 Independent Study or Research (\*) AWSpS

#### CMU

700 Master's Thesis (\*)

#### CMU

800 Doctoral Dissertation (\*)

# **COMPARATIVE AND** FOREIGN AREA STUDIES

#### East Asia

#### GENERAL

#### COURSES FOR UNDERGRADUATES

#### EASIA

#### 210 The Far East in the Modern World (5) AW

#### Palais, Taylor

Social, economic, and political problems of China, Japan, Korea, and Southeast Asia. Includes development of Russia as an Asiatic power, as well as the role of Western powers in the Far East.

#### EASIA

499 Undergraduate Research (3-5, max. 15) AWSD

#### ART H

301 Survey of Asian Art (5)

# ART H

401 Oriental Ceramic Art (2)

#### ART H

417 Buddhist Painting of China and Japan (3)

#### ART H

418 **Buddhist Sculpture of China and Japan** (3)

#### ART H

- 419 Chinese and Japanese Architecture (3) **CLIT**
- 302 World Classics of the Orient (5)

DRAMA 477, 478, 479 History of Far Eastern Theatre and Drama (3,3,3)

DRAMA 495 Special Studies in the Theatre Arts of Asia (3, max. 9)

GEOG 313 East Asia (5)

HSTAS 211 History of Chinese Civilization (5)

HSTAS 212 History of Korean Civilization (5)

HSTAS 213 History of Japanese Civilization (5)

**I BUS** 450 East-West Economic Relations (4)

MUSAP 159 Private Instruction: Non-Western Instruments (2-3, max. 9)

MUSIC 316, 317, 318 Music Cultures of the World (5.5.5)

- POL S
- International Relations in the Far East 429 (5)

#### POL S

432 American Foreign Policy in the Far East (5)

COURSES FOR GRADUATES ONLY

#### EASIA

500 **Research Seminar in Asian Arts** (3-5, max. 15) Sp McKinnon, Rogers Interdisciplinary inquiry into history, esthet-ics, and forms of Asian arts. Prerequisite, permission.

EASIA 600 Independent Study or Research (\*) AWSp

ANTH

537 Non-Western Political Systems (3)

**CLIT** 576 Non-Western Literary Traditions

(3-5, max. 15)

# CHINA

**COURSES FOR UNDERGRADUATES** 

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.

#### EASIA

443 Chinese Social Institutions (5) A General survey of traditional institutions and their changes in modern times.

#### EASIA

455 Undergraduate Colloquium on China (5) WSp

Palais, Townsend

Interdisciplinary study of China, with emphasis on the modern period. Prerequisite, permission. ANTH 403 Traditional Chinese Society (5)

- ART H 411 Early Chinese Painting: T'ang to Ydan (3)
- ARTH 412 Later Chinese Painting: Yuan Through Ch'ing (3)
- CHIN 361 Vernacular Chinese Literature in Translation (5)
- CHIN 362 Chinese Literature in Translation: Middle and Early Modern Periods (5)
- CHIN 363 Chinese Literature in Translation: Ancient Period (5)
- CHIN **Chinese Reference Works and** 407 **Bibliography (3)**
- C LIT 410 Literary Motifs (3-5, max. 10)
- ECON 466 Economic History of China: 1840-1949 (5)

ECON 493 Economy of Modern China (5)

GEOG 336 Regional Geography of China (5)

GEOG 435 Problems in the Geography of China (5) HSTAS

- 451 Chinese History: Earliest Times to 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
- Western Influences in Russian and 476 Chinese Intellectual History (4)
- MUSIC 497 Music of China (3)
- PHIL 415 Chinese Philosophy (5)
- PHIL 416 Neo-Confucianism (5)
- POL S
- 414 Chinese Political Thought (5)
- POL S 442 Government and Politics of China (5)

COURSES FOR GRADUATES ONLY

EASIA 521-522 Seminar: Introduction to the Interdisciplinary Study of China (5-5) W.Sp Townsend

EASIA 530 Seminar on China (3, max. 6) Sp Chan, Dull, Kapp Problems of Chinese history. Prerequisite, permission.

312

# 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)-(3-6)-(3-6)

HSTAS

561 Field Course in Chinese History, Sung to Modern (3-6) (Formerly 564.)

#### HSTAS

562-563-564 Seminar in Chinese History: Sung to Modern (3-6)-(3-6)-(3-6) (Formerly 547-548-549.)

HSTAS 571-572 Chinese History: Modern Period (3-6)-(3-6)

HSTAS

573-574-575 Seminar in Chinese History: Modern Period (3-6)-(3-6)-(3-6) (Formerly 556-557-558.)

POL S

532 The Chinese Political System (3)

- POL S
- **Seminar on Contemporary Chinese** 533 **Politics (3)**
- POL S

**International Relations of Modern** 535 China (3-5)

JAPAN

#### COURSES FOR UNDERGRADUATES

### EASIA

The Emergence of Postwar Japan (5) A Hellman, Pyle, Yamamura 440 The making of modern Japan; World War II

and surrender; American occupation; postoccupation rebuilding; emergence as an industrial power.

#### EASIA

#### 441 Economic History of Japan to 1900 (5) Hanley, Yamamura

Lecture-seminar on Japanese economic history from 700 to 1900. Includes analyses of the rise and disintegration of the 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. While social change is evaluated, the major emphasis is placed on economic analysis and empirical examination.

#### EASIA

451 Undergraduate Colloquium on Japan (5)

Beckmann

#### ART H

Later Japanese Painting: Sixteenth to 416 Nineteenth Centuries (3)

ART H

Early Japanese Painting: Twelfth to 561 Sixteenth Centuries (3) (Formerly 564.).

- C
- GEOG 437 Problems in the Geography of Japan (3 or 5)
- HSTAS 421 History of Early Japan (5)
- HSTAS 422 History of Tokugawa Japan (5)
- HSTAS 423 History of Modern Japan (5)
- HST 443 The United States and Japan: A Sense of the Past (5)
- JAPAN
- 421 Japanese Literary Tradition in English (5)
- JAPAN 422 Tokugawa Literary Tradition in English (5)
- JAPAN 423 Modern Japanese Literature in English (5)
- JAPAN
- 441 Studies in Japanese Poetry in English (5)
- JAPAN 442 Studies in Japanese Prose in English (5)
- JAPAN 443 Studies in Japanese Drama in English (5)
- JAPAN 461, 462, 463 Readings in Modern Japanese Literature (3-5,3-5,3-5)
- MUSIC 494 Music of Japan (3)
- MUSIC 495 Music of Japan (3)
- POL S 435 Japanese Government and Politics (5)
- COURSES FOR GRADUATES ONLY
- 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.
- 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)-(3-6)
- 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

COURSES FOR UNDERGRADUATES

HSTAS 481, 482 History of Korea (5,5) (Formerly 469, 470.)

- KOR 320 Korean Literature in English (5)
- MUSIC 426 Music of Korea (3)

COURSES FOR GRADUATES ONLY

HSTAS 581 Modern Korean History (3-6) (Formerly 570.)

HSTAS 582-583-584 Seminar on Korean History (3-0)-(3-0)-(Formerly 571-572-573.)

HSTAS 585 Research Seminar: Modern Korea (3-6) (Formerly 566.)

### **Russia and Eastern Europe**

### GENERAL

COURSES FOR UNDERGRADUATES

REEU

#### 220 Introduction to Russian and East European Studies (5) W Boha

Geographic setting, ethnic composition, religions, cultural pattern, economic problems, social and political institutions of Eastern Europe in the past and the present.

- REEU
- 378 Russia and Asia (3) Sp ·

Waugh Russian expansion into Central Asia. Russian and Soviet policies toward nationalities.

313

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

#### 417, 418, 419 Communist States of North-Central Europe (5,5,5) A,W,Sp

North-Central Europe (5,5,5) A,W,Sp Legters

Contemporary history (since 1945) of the countries of North-Central Europe: Poland, Czechoslovakia, and East Germany. Emphasizes comparative developments in Russian countries in relation to the whole of the Soviet orbit. Prerequisite, East European history or politics, or permission.

#### REEU

499 Undergraduate Research (3-5, max. 15) AWSp

For Russia and Eastern Europe majors. Prerequisite, permission.

HSTEU

447 Russian and East European Bibliography (5)

HSTEU

450 Ethnic History of Russia and East Europe (5)

COURSES FOR GRADUATES ONLY

#### REEU

500 Interdisciplinary Research Seminar (\*) 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.

#### 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.

Investigation of the deeper and more complex

historical and philosophical problems encoun-

tered in understanding Marxist thought of the nineteenth and twentieth centuries. Prerequi-

sites, 401, 402, 403, or equivalent in other de-

#### REEU

partments.

508 Seminar: Problems in the Study of Marxism (3-5, max. 15) W Legters

#### REEU

510 Seminar in Soviet Literary Politics (5) Sp

Swavze

Examination of literary policies of the Soviet regime and their impact on Soviet belleslettres. Prerequisites, HSTEU 445 or Political Science 441, Russian 421, or permission. Reading knowledge of Russian desirable.

#### DEFI

600 Independent Study or Research (\*) AWSp

#### RUSSIA

COURSES FOR UNDERGRADUATES

#### REEU

**Russian Civilization (5) AWSp** 243

Ellison, 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, Waugh

Survey of the political, economic, and social institutions, and the literature and fine arts of the Soviet Union.

#### REELI

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.

#### DEED

Undergraduate Colloquium on Russia (5) 457 Sp

Boba, Sugar

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) W Swayze

Honors program seminar. Prerequisite, permission of Honors adviser.

#### 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 Regionalizatioon (3 or 5)

#### **HSTEU**

438 Modern Russian Intellectual History (5)

#### **HSTEU**

442 Russian Culture to the Era of Peter the Great (5)

#### HSTEU

443 Kievan and Muscovite Russia, 850-1700 (5)

#### HSTELL

444 Imperial Russia, 1700-1900 (5)

#### HSTEU

- 445 Twentieth-Century Russia (5)
- HSTEU 446 Russian Historiography (5)
- RUSS 320 Russian Literature in English (5)
- RUSS
- **Early Twentieth-Century Russian** 420 Literature in English (5)
- RUSS
- 421 Contemporary Russian Literature in English (5)

#### RUSS

422 Russian Plays in English (5)

- RUSS
- 424 Pushkin and Gogol in English (5) RUSS
- 426 Goncharov and Turgenev 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 **Government and Politics of the** 441 Soviet Union

#### COURSES FOR GRADUATES ONLY

C LIT 580 Literary Relations (3-5, max. 15)

ECON 595 Soviet Economics (3)

# GEOG

533 Research Seminar: Soviet Union (3, max. 6)

#### HSTEU

541 Medieval Russian History (3-6)

HSTEU 543 Seminar on Medieval Russian History (3-6)

#### HSTEU

- 544 Modern Russian History (3-6)
- HSTEU 545-546-547 Seminar on Modern Russian History (3-6)-(3-6)-(3-6)
- HSTEU 548 Field Course in Soviet History (3-6)
- POL S 520
- Seminar on the Foreign Policy of the Soviet Union (3)

314

#### POL S

541 The Soviet Political System (4)

POL S 546 Seminar in Problems of Soviet Politics (3)

### EASTERN EUROPE

#### COURSES FOR UNDERGRADUATES

REEU

#### 406, 407, 408 Revolutionary Movements in Eastern Europe (3,3,3) A,W,Sp Legters

Historical analysis of the ideological and social character of revolutionary movements, chiefly nationalist and communist, in Eastern Europe from 1848 to World War II.

#### 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.

#### GEOG 305 Eastern Europe (5)

GEOG 405 Problems of Eastern Europe (5)

HSTAM

426 Origins of European States (5)

HSTEU 451 Eastern Europe, 1772-1918 (5)

HSTEU 452 Eastern Europe Since 1918 (5)

HSTEU 453 History of the Balkans, 1400-Present (5)

CZECH 320 Czech Literature in English (5)

POLSH 320 Polish Literature in English (5)

MUSIC

POL S

GEOG

HSTAM

HSTEU

HSTEU

HSTEU

(3, max. 6)

Present (5)

530 Early Middle Ages (3-6)

SER C 320 Serbo-Croatian Literature in English (5)

318 Music Cultures of the World (5)

347 Governments of Eastern Europe (3)

COURSES FOR GRADUATES ONLY

503 Research Seminar: Eastern Europe

551 History of Eastern Europe, 1772-1939 (5)

552 History of Eastern Europe, 1939 to the

European History (3-6)-(3-6)-(3-6)

553-554-555 Seminar on Modern East



#### South Asia

COURSES FOR UNDERGRADUATES

SASIA

200 South Asia Today (5) W Potter

Introduction to major aspects of life in present-day India, Pakistan, Bangladesh, Ceylon, and Nepal. National and regional cultural, political, social, and economic features. Taught by specialists in the disciplines and areas involved.

SASIA

291 Hinduism (3) Sp

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

#### 472 Introduction to Buddhism (3) Sp Ruegg

Basic doctrines: I. The Conditioned World; II. Its Origins; III. The Unconditioned World; IV. The Path Which Leads From One World to the Other and the Persons Who Use It. Prerequisite, permission.

SASIA

473 Readings in Buddhism (5, max. 15) Sp Ruegg

Study of texts in the following sequence: The Heart of Sutra, The Diamond Sutra, selected passages from The Large Sutra on Perfect Wisdom. Prerequisite, permission.

#### SASIA

#### 498 Undergraduate Colloquium on South Asia (5) Sp

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

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 Twentleth-Century India (5) HSTAS

405 Maharashtra in Indian History (5)

LING 404, 405, 406 Indic and Indo-European (3,3,3)

### INDN

420 Classical Indian Literature in English (5) INDN

421 Modern Indian Literature in English (5)

MUSIC 428 Music of India (3)

PHIL

286 Introduction to India's Philosophies (5)

PHII.

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.

ANTH

517 Seminar on South Asia (3)

ART H 521 Seminar on Indian Art (3, max. 9)

HSTAS

501 Indian History (3-6)

PHIL 586 Seminar on Indian Philosophy (3, max. 12)

POL S

540 Seminar on Modern Indian Politics (3)

### 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)

POLS

531 Problems of Southeast Asian Politics (3)

315

### Inner Asia

COURSES FOR UNDERGRADUATES IASIA

430 Survey of Mongol Culture (3) Sp 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.

For institute majors. Prerequisite, permission.

320 Mongolian Literature in English (5)

COURSE FOR GRADUATES ONLY

579 Comparative Altaic Linguistics (3)

320 Eastern Turkic Literature in English (3)

Offered jointly with the Department of Asian

Languages and Literature as Mongolian 579.

**COMPARATIVE LITERATURE** 

250 Introductory Studies in World Literature

Basic concepts of literary study and the

methods of comparative study. Materials from

various national and linguistic cultures are ex-

amined. Contents vary. Consult Comparative

Literature office for specific details each quar-

ter the course is offered. Readings are in

261, 262, 263 Modern African Literature (3-5,

Survey course in African literature from the

colonial period to the present with specific ref-

erences to the themes of nostalgia, rebellion, and humanism. Readings and discussion of, and

reports on, representative works in prose, po-

etry, and drama. Among authors studied:

Achebe, Mphahlele, Oyono, Paton, Senghor, Soyinka, Tutuola.

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

301 World Classics of Germany, Russia, and

Great works of Danish, German, Icelandic,

3-5,3-5) A,W,Sp

**Courses for Undergraduates** 

IASIA 499 Undergraduate Research (3-5, max. 15)

MONG

TKIC

LING

C LIT

English.

**CLIT** 

CLIT

C LIT

Romance literature.

Scandinavia (5) W

(3-5)

AWSp

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.

#### **CLIT**

#### 302 World Classics of the Orient (5) Sp

Great works of Chinese, Japanese, and Korean literature and thought, read in English and taught by specialists in Asian literature. Content varies. Consult the Comparative Literature office each quarter for information concerning quarterly offerings.

#### **C LIT**

#### 357 Literature and Film (3-5, max. 10)

Examination of the film as an art form, with particular reference to the literary dimension of film and to the interaction of literature with the other artistic media employed in the form. Films are shown as an integral part of the course. Course content varies. Consult the Comparative Literature office for specific details each quarter the course is offered. (Formerly 257.)

#### C LIT

#### 396 Special Studies in Comparative Literature (3-5, max. 10)

Offered occasionally by visitors or resident faculty. Content varies. Consult the Compara-tive Literature office each quarter for information concerning quarterly offerings.

#### **CLIT**

#### 400 Heroic Poetry (5) W

Ancient, medieval, and Renaissance epic poems, read in English. The Gilgamesh epic, Iliad, Odyssey, Metamorphoses, Aeneid, The Song of Roland, and Jerusalem Delivered.

#### **C**LIT

401 Modern European Drama (5) A Selected plays, read in English, by Ibsen, Strindberg, Chekhov, Pirandello, Brecht, Camus, Durrenmatt, the absurdists, and others, representing naturalism, expressionism, theatricalism, and other movements that have shaped the modern European theater.

#### C LIT

#### 410 Literary Motifs (3-5, max. 10)

Examination of important fictional figures, situations, and plots that, through their repeated recurrence in world literature, appear to have a profound and universal significance for the human imagination. Course content varies. Consult the Comparative Literature office for specific details each quarter the course is offered. Foreign-language texts are read in English translation.

#### **CLIT**

415 The Comic in Literature (5) Study of masterpieces of comic literature emphasizing various modes and uses of the comic. Prerequisites, junior standing and at least 10 credits of literary study.

#### **C LIT**

430 Modern Greek Literature (3-5) Modern Greek literature from the early nineteenth century to the present, with selected readings in translation from a number of writers. Special emphasis is placed on the transmission and adaptation of themes, images, and language from Homer, classical Greece, the Alexandrian poets, the Byzantine era, and folk literature, as they have been incorporated into vernacular works. It includes such authors as Palamas, Solomos, Cavafy, Seferis, and Kazantzakis. Prerequisite, junior standing.

# C'LIT 440 The Novel (3-5, max. 10)

Examination of the novel as a genre. Material varies with the individual faculty members who offer it, but, normally, the larger technical, social, and philosophical questions are illustrated through intensive study of novels by two or more writers from different national cultures. Non-English works may be read in translation; therefore, foreign-language knowledge is not necessarily required.

#### **CLIT**

#### 450 Afro-Occidental Literary Relations (3-5, max. 10)

Examination of selected works of African literature, with particular attention being paid to some of the varied relations of influence and affinity existing between them and certain typical works of occidental literature, e.g., French and American. Course content varies. Consult the Comparative Literature office for specific details each quarter the course is offered. Knowledge of a foreign language is sometimes required.

#### **C LIT**

#### 472 Studies in Narrative (3-5, max. 10)

Narrative styles and developments from antiquity to the present. Course content varies. Consult the Comparative Literature office for specific details each quarter the course is offered.

#### **CLIT**

# 480 Modern European Poetry (5) Selected works read in English, by French, German, Italian, and Spanish poets from the

Romantic period to the present.

#### **CLIT**

#### 490 Directed Study or Research (1-5, max. 10) AWSpS

Individual study of topics in comparative literature by arrangement with the instructor and the Comparative Literature office.

#### **C**LIT

#### 496 Special Studies in Comparative Literature (5, max. 15)

To be offered occasionally by visitors or resident faculty. Consult the Comparative Literoffice for specific details each quarter course is offered.

#### **Courses for Graduates Only**

Consult the Comparative Literature office for information on the quarter and year the courses below will be offered.

#### CLIT

#### 510 Theories and Methods of Comparative Literary History (5, max. 10) A

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 The Art of Translation (5, max. 10) W Lectures on principles of translating literary works into readable English. Students present and comment on translations made by them and write seminar papers on problems of translation in theory and practice.

#### **C LIT**

#### 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.

#### CLIT

515 Recent Trends in Literary Criticism (3) Study of some of the recent trends in literary criticism; in particular, structural and philosophical approaches.

#### **C**LIT

522, 523 Existentialism and Literature: Form and Content (3,3)

Study of the effects of existential and phenomenological thought on literary themes and techniques.

#### **CLIT**

#### The Baroque in Criticism and Literature 525 (3-5, max. 15)

Investigation into the origins and history of the term as used in literary criticism, accompanied by a study of representative Baroque literature in various countries. Included are such works as Don Quixote, Phedre, and French, Spanish, Italian, and German poetry available in translation, but preferably to be read in the original.

#### **C** LIT

#### 530 Comparative Study of French and German Courtly Epic (3)

Three major works of the German and French courtly epic, *Erec*, *Perceval*, and *Tristan*, are systematically compared.

#### C LIT

C L11 535 Poetic Forms (3-5, max. 15) Seminar concerned with the evolution, dis-semination, and function of metrical and stanzaic forms in various literatures. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of one foreign language.

C LIT

#### 540 Eighteenth-Century European Esthetics (3)

Analysis of important works of eighteenthcentury estheticians in England, France, and Germany. Prerequisite, facilitty in reading either French or German.

#### **CLIT**

#### 545 Studies in Renaissance and Baroque Epic Poetry (3)

Study of Renaissance and Baroque epic poetry, including works of Ariosto, Tasso, Spenser, Milton, and others. Prerequisite, reading knowledge of either French, Italian, Spanish, or Portuguese.

#### **C LIT**

### 546 Studies in the Renaissance (3-5, max. 10) Examination of various aspects of Western European literature during the Renaissance. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, reading knowledge of at least one European language.

#### C LIT

#### Classical Tradition in Medieval and 547 Renaissance Europe (3-5, max. 15)

Intensive study of a single topic or genre. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, reading knowledge of Latin or Greek, and French or Italian.

#### C LIT

#### 550 European Realism (3)

Seminar study of works of European Realism (Balzac, Flaubert, Turgenev, Dostoevski, Tol-stoy, 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 litera-tures. Prerequisite, reading knowledge of French, Italian, or German.

### C LIT

#### 565 Studies in Nineteenth-Century Literature (3-5, max. 15)

Seminar examining various aspects of nineteenth-century European literature. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of one foreign language.

#### **CLIT**

#### 570 Studies in the Novel (3-5, max. 15)

Two two-hour seminars comparing two or more novels of varying national literatures. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, reading knowledge of one foreign language.

#### **C 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 Comparative Literature office for specific details each quarter the course is offered. Prerequisite, reading knowledge of one foreign language.

#### **CLIT**

# 573 Studies in the Drama (3-5, max. 15)

Examination of various aspects of the drama as a major literary genre, as approached from in-ternational and multilingual points of view. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of one foreign language.

#### **CLIT**

### 574 Literary Motifs (3-5, max. 10)

Examination of important fictional figures, situations, and plots that, through their repeated recurrence in world literature, appear to have a profound and universal significance for the human imagination. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of at least one foreign language.

#### **CLIT**

575 Intercultural Relationships in Literature (3-5, max. 15)

Seminar or seminars examining significant relationships among the literatures of various national cultures during various historical periods. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite. reading knowledge of one foreign language.

#### **CLIT**

#### 576 Non-Western Literary Traditions (3-5, max. 15)

Provides those with a background in Western literary criticism an awareness of features characterizing wholly separate, long, and strongly sustained critical traditions in other areas (e.g., China). Normally, translations are assigned for nonreaders of the foreign language or languages concerned. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered.

#### C 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 Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of one foreign language.

#### **CLIT**

### 581 Literature and Psychology (3-5, max. 10) Seminar exploring ideas, critical procedures, and problems in this interdisciplinary area. Though various psychological viewpoints are discussed, special attention is given to those concerned with unconscious mental processes. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Neither previous course work in psychology nor knowledge of a foreign language is required.

#### **CLIT**

#### 585 Literature of Islam and Europe (3-5, max. 15)

Seminar examining the mutual influences between Islamic literature and culture (chiefly Arabic and Persian) and European. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of one foreign language.

### C 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 resi-dent faculty. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered.

#### CLIT

#### 600 Independent Study or Research (\*) AWSpS

C LIT 700 Master's Thesis (\*) AWSpS

### C LIT

800 Doctoral Dissertation (\*) AWSpS

### DRAMA

#### DRAMA

### **Courses for Undergraduates**

### DRAMA

#### 101 Introduction to the Theatre (5) AWSp Galstaun

Introduction to the theatre as an art form with emphasis on the play in production. The role of the various theatre artists: actors, directors, designers, and playwrights. Required attendance at one or more performances. Lecture and discussion groups. Open to nonmajors.

# DRAMA 102, 103 Play Analysis (3,3)

Descriptive analysis of plays, both modern and historical, to provide tools for the student to read a text critically and creatively.

#### DRAMA

121, 122, 123 Movement for the Actor (2,2,2) Movement for the actor based on Lecoq 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: de-velopment 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, Eliza-bethan. Prerequisite, acceptance for the Bachelor of Fine Arts program.

# DRAMA 181, 182, 183 Play Analysis for the Actor (2,2,2) A,W,Sp

Ross

Play analysis from the point of view of the actor. 181: the principles of method and their imaginative integration for the actor. 182: application of analysis method to Elizabethan plays. 183: application to Jacobean plays. Prerequisite, acceptance for the Bachelor of Fine Arts program.

#### DRAMA

#### 201 Introduction to Black Theatre (5) A Mobley

Intensive lecture-laboratory course in the

theory and practice of Black theatre productions, with emphasis on the works of Black playwrights. Critical analysis of Black plays.

#### DRAMA

#### **202** Introduction to Black Theatre: Historical Plays (3) W

Moblev Intensive laboratory course in the theory and the practice of Black theatrical productions, with emphasis on the work of Black play-wrights. Prerequisites, 201 and permission.

#### DRAMA

#### 203 Introduction to Black Theatre: **Contemporary Plays (3) Sp**

Mobley

Continuation of 202. Prerequisites, 202 and permission.

# DRAMA 210, 211, 212 Theatre Technical Practice (2 or 4, 2 or 4, 2 or 4)

Crider, Lounsbury Intensive lecture, laboratory course in basic theories, techniques, and equipment of stage scenery, lighting, costumes, and scene painting. 210: scene construction and scene painting. 211: costumes. 212: lighting and technical stage procedures. Crew work required in addition to scheduled class hours.

#### 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, Valentinetti

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 (4,4,4) A,W,Sp Roberts, White

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 Drama-Dance 101, 102, 103, which must be taken concurrently.

#### DRAMA

#### 255, 256, 257 Acting (5,5,5) A,W,Sp

255: Elizabethan and Jacobean styles. 256: res-toration 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)

Ross Prerequisite, completion of first year of the Bachelor of Fine Arts program.

#### DRAMA

#### 274 Great Ages of the Western Theatre (5) A Lorenzen

History of the Western theatre and its drama to the present. Designed to acquaint the student with the magnitude and scope of the theatre as a vital part of the history of man and civilization. Lecture and discussion. Open to nonmajors.

#### 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 Forrester

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) Sp,W Forrester, Gray

325: fundamentals of scenery, lighting, and costume design and construction. 326: fundamentals of directing, especially for high school, with some acting. Open to nonmajors.

#### DRAMA

#### 331 Puppetry (3) AWSp

Valentinetti Introduction to puppetry; construction and use of simple puppets as a visual aid in education, recreation, and therapy.

#### 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 EDPSY 304, 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 (4,4,4) A,W,Sp Loper, White

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

#### 371, 372, 373 Special Studies (2,2,2) A,W.Sp Ross

Specialized and individualized work related to the main curriculum of the third year of the Bachelor of Fine Arts program. Prerequisite, completion of two years in the Bachelor of Fine Arts program.

#### 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 1975-76.)

#### DRAMA

#### 375 History of the Roman Theatre and Its Drama (3) W

#### Lorenzen

See 374 for course description. (Not offered 1974-75.)

#### DRAMA

376 History of the Medieval and Commedia Dell'arte Theatres and Their Drama (3) Sp

#### Lorenzen

See 374 for course description. (Not offered 1974-75.)

#### DRAMA

#### 377 History of the European Renaissance Theatre and Its Drama (3) W Wolcott

See 374 for course description. (Not offered 1974-75.)

#### DRAMA

378 History of the English Theatre and Its Drama: 1500-1700 (3) W

Lorenzen See 374 for course description. (Not offered 1975-76.)

#### DRAMA

#### 379 History of the European Theatre and . Its Drama: 1700-1875 (3) A Wolcott

#### See 374 for course description. (Not offered 1975-76.)

#### DRAMA

#### 401 Innovations in Drama (6, max. 12) S Wolcott

Intensive, practical seminar in theatre and drama, stressing innovations in content and teaching approach in various special fieldsacting, 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 the conventional modes of thought about drama. For advanced undergraduates and graduates only. Prerequisite, permission. (Formerly 484.)

# DRAMA

#### 402 English Summer Theatre School (9-12, max. 12) S White

The English Summer Theatre School is a foreign-study program offered to theatre students of serious purpose. The program includes: studio classes in movement, speech, period styles, tours, theatre parties, lectures, and rehearsal and performance. Prerequisite, permission.

#### DRAMA

410, 411, 412 Advanced Theatre Technical Practices (3, max. 9; 3, max. 9; 3, max. 9) AWSp,AWSp,AWSp

Crider, Dahlstrom, Forrester, Lounsberry Apprenticeship, under faculty-staff supervision,

in theories, techniques, and equipment of stage scenery, lighting, costumes, and scene painting. 410: scene construction and scene painting. 411: costumes. 412: lighting and technical stage procedures. Prerequisites, 210 for 410; 211 for 411; 212 for 412.

#### DRAMA

#### 413 Advanced Scene Construction and Drafting (5) W

Davis, Lounsbury

Special problems in scene construction and rigging with laboratories in working drawings and scenic 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 109 and ART H 203, or equivalent.

#### DRAMA

#### 415 Stage Costume Design (3, max. 6) ASp Crider

Theory, practice, and rendering of costume designs for the theatre. Repeat of course involves intermediate designs. Prerequisites, 211, ART 109 and ARTH 203 or equivalent; 411 for repeat of course.

### DRAMA

#### 416 History of Clothing and Costume (5) A Crider

Survey history of clothing and theatrical costume; emphasis on the dress of the audience and the actor in historic periods of theatrical activity. Prerequisites, 211 and ARTH 203 or equivalent, or permission.

#### DRAMA

#### 417 Advanced Stage Costume Construction (3) W

Crider

Techniques of costume construction, including study of fabrics, color, and fundamentals of pattern making and draping for historic clothing reconstruction. Prerequisite, 211 or permission.

#### DRAMA

419 Stage Lighting (3) Sp

Lounsbury Theories and methods of lighting with emphasis on lighting plots. Laboratories consist of analysis of lighting instruments and control, color experiments, and basic 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 and producing plays by children for children, employing improvisation, adaptation, interpretation, and communication. Prerequisites, 336; 325 or 210, 211, and 212; and permission.

#### DRAMA

437 Laboratory in Teaching Drama to Children (1) AWSp

#### Siks

Practical experience in teaching drama to children. Prerequisites, 336, 438, 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) AW

Cranston, White

Production of a professional quality television dramatic program involving writing, acting, and videotaping. Open to students who have had Communications 373 or 361 (for writers and producers), or Drama 353 (for actors). Offered jointly with the School of Communications as Communications 473. Prerequisite, permission.

#### 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 Falls, 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 Falls, 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

319

#### Falls, Sydow Prerequisites, 462 and permission.

#### 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 influ-enced the theatre of the period. (Not offered 1975-76.)

#### DRAMA

#### 473 History of the European Theatre and Its Drama From 1875 (3) Sp Wolcott

See 472 for course description. (Not offered 1974-75.)

#### DRAMA

#### 474 History and Esthetics of the Motion Picture (3) Sp

Galstaun

Lectures and exhibition of important and representative films, foreign and American, illus-trating the evolution of this art form. Open to nonmajors. Prerequisite, junior-senior standing.

#### DRAMA

475 History of the American Theatre and Its Drama to 1900 (3) Sp Wolcott

See 472 for course description. (Not offered 1975-76.)

#### DRAMA

476 History of the Modern American and English Theatre and Its Drama From 1900 (3) A Lorenzen

See 472 for course description. (Not offered 1974-75.)

#### DRAMA

#### 477, 478, 479 History of Far Eastern Theatre and Drama (3,3,3) A,W,Sp

Conwav 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. Prerequisites, English 374, 375, and 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) 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, 415, and permission.

#### DRAMA

#### 497 Theatre Organization and Management (2) Sp Falls

Theoretical and practical examination of the professional theatre organization and management: legal structures, funding, business 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 or 5, max. 13)

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 Lounsbury

Practical experience in mounting scenery for a current production. Prerequisites, 413 and permission.

# DRAMA 517, 518, 519 Studies in Historic Design (5.5.5)

Conway, Crider, Dahlstrom

Investigation of artistic principles and modes that influenced the art, architecture, furniture, and decor of selected historic periods. Prerequisites, 517 for 518; 518 for 519, or permission.

#### DRAMA

#### 520 Advanced Theatre Practicum (1-5, max. 15)

Graduate student apprenticeship with professional theatre shops—scenery, lighting, scene painting, or costume. Prerequisites, 513 or 514 or 515, and permission.

#### DRAMA

530 Seminar in Children's Drama (5) W Siks

Critical study of philosophies and practicespast 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"; 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

Sydow

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.

#### DRAMA

### 571, 572, 573 Problems in Theatre History Research (3,3,3) A,W,Sp

Lorenzen, Wolcott Methods and techniques of research in theatre history. Relationship of theatre arts to other arts and society in major periods of theatre history. Prerequisites, 571 for 572; 572 for 573.

DRAMA 575, 576, 577 Seminar in Theatre History (3,3,3) A,W,Sp

Lorenzen, Wolcott Prerequisites, 571, 572, 573.

DRAMA 585, 586, 587 Seminar in Drama (3,3,3) A,W,Sp

Seminar inquiring into the relationships between scholarship, criticism, and theatre art. Prerequisite, permission. (Formerly 581, 582, 583.)

#### 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

Independent Study or Research (\*) 600 AWSp

#### DRAMA 700 Master's Thesis (\*) AWSp

#### DRAMA-DANCE

#### **Courses for Undergraduates**

#### DRDNC

101, 102, 103 Dance 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.

#### DRDNC

#### 145 Introduction to Dance History and Literature (1) AWSp

Roris

Historic survey of dance and development of specific dance forms together with a study of major dance literature.

#### DRDNC

#### 201, 202, 203 Dance Techniques II (5, max. 15; 5, max. 10, 5, max. 10) A,W,Sp

Dance techniques at the intermediate level. Ongoing study in the history of dance is an integrated part of classwork as concerns specific dance styles when they are introduced into the sequential studio work. Prerequisites, 103 or permission for 201; 201 or permission for 202; 202 or permission for 203.

#### DRDNC

220 Pointe Technique (1, max. 6) AWSp Fundamentals of the technique of dancing on the toes (en pointe). Prerequisites, 103 or permission and concurrent registration in dance techniques course.

#### DRDNC

#### 223 Men's Special Techniques (1, max. 6) AWSD

Special techniques for the male dancer in both ballet and modern dance styles. Prerequisites, 103 or permission and concurrent registration in dance techniques course.

#### DRDNC

#### Folk/Ethnic Dances of Western 231 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.

#### DRDNC

# 232 Folk/Ethnic Dances of Eastern Europe and Middle East (1, max. 6) One-quarter course offerings of folk and ethnic

dances of Eastern Europe and the Middle East, i.e., Greek, Balkan, Russian, African. See *Time Schedule* for specific offering. Pre-requisite, 103 or audition.

#### DRDNC

#### Folk/Ethnic Dances of Eastern Cultures 233 (1, max. 6)

One-quarter course offerings of folk and ethnic dances of Eastern cultures, i.e., Korean, Japa-nese, East Indian, Cambodian. See Time Schedule for specific offering. Prerequisite, 103 or audition.

### DRDNC

#### 301, 302, 303 Dance Techniques III (3-5, max. 15; 3-5, max. 10; 3-5, max. 10) A,W,Sp

Dance techniques at the advanced level. 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.

#### DRDNC

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.

#### DRDNC

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.

#### DRDNC

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.

#### DRDNC

#### 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.

#### DRDNC

327 Afro-American Styles (1, max. 6) Study and practice of various dance styles cur-

rently developing in the United States, combining African and American dance forms and techniques. Prerequisite, 103 or audition.

#### DRDNC

#### 328 Popular Dance Styles (1, max. 6)

All forms of American social dance, contemporary and traditional. Prerequisite, 103 or audition.

#### DRDNC

329 Tap and Soft-Shoe Techniques (1, max. 6) AWSp

Rall

Study and practice of tap and soft-shoe techniques. Study of the history and development of modern tap dancing. Prerequisites, audition and permission.

#### DRDNC

### 401, 402, 403 Dance Techniques IV (3-5, max. 10; 3-5, max. 10; 3-5, max. 10)

A,W,Sp

Dance techniques at the advanced professional level. Prerequisites, 303 or permission for 401; 401 or permission for 402; 402 or permission for 403.

#### DRDNC

#### 465 Experimental Dance Workshop (3, max. 9) AWSp

Workshop-laboratory designed to explore experimental approaches to dance. Prerequisite, permission.

#### DRDNC

#### 470 University of Washington Dance Company (1, max. 12) AWSp

Participation in dance productions, either studio showings or staged performances, presented under faculty direction or supervision. Prerequisites, audition and permission.

### 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 American Economic History (5) AWSp

Analysis of American economic growth and change interpreted as part of the general expansion of the North Atlantic economy. Stresses the historical background to contemporary American economic problems.

#### **ECON**

#### 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 Mathematics 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 Mathematics 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 is 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. Prerequisite, 200 or equivalent is recommended.

#### **ECON**

#### 406 Undergraduate Seminar in Economics (5) AWSp

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 Mathematics 124 has been taken.

#### ECON

#### 411 Introduction to Mathematical Economics II (5)

Introduction to functions of several variables with applications to economics. Partial derivatives, the implicit function theorem, theory of minima and maxima. Economic applications include the Slutsky equations of consumer theory and an elementary mathematical investigation of neoclassical production theory. Prerequisite, 410 or Mathematics 124.

#### ECON

#### 412 Introduction to Mathematical Economics III (5)

Theory and application of linear algebra and matrix methods with special emphasis on problems originating in economic theory. Prerequisite, 411 or Mathematics 124.

#### ECON

#### 416 Urban Economics (5)

Application of economic analysis to urban trends, problems, and prescriptions, such as changing urban form and function, urban public finance, housing and renewal, poverty and race, transportation, and environmental problems. Offered jointly with the Department of Geography as Geography 416. Prerequisite, 300 or 400, or equivalent.

#### MONEY, BANKING, AND CYCLES

#### ECON

320 Money and Banking (5) 8

Demand for, and supply of, money; the bank-

ing system and other financial institutions are studied, with attention to their role in in-flation and recession. Prerequisites, 200 and 201, or permission.

#### ECON

421 Money, Credit, and the Economy (5) S Supply and the use of money, bank deposits, and bank reserves. Relationship of Treasury, Federal Reserve, and commercial bank policies, and the value of money. Factors generating flows of money income. Prerequisites, 300, 301 or equivalent, or permission.

#### **GOVERNMENT REGULATION AND** INDUSTRIAL ORGANIZATION

#### **ECON**

#### 330 Government and Business (5) AWSp

Study of government and business relations, centering on (1) an analysis of market structures, conduct, and performance, and (2) the application of public policies designed to secure desired economic performance. Microeco-nomics is given a realistic institutional and empirical content. Special consideration is given to federal antitrust legislation and its application to mergers, business concentration, and restrictive business practices. Prerequisite, 200 or equivalent, or permission.

#### ECON

#### 404 Industrial Organization and Price Analysis (5) A

Study of selected market structures. Directed toward developing more precise predictive techniques and more adequate bases for analysis of public policy. Prerequisite, 300 or equivalent, or permission.

#### **ECON**

#### 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

#### 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. Prerequi-sites, 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.

#### ECON

#### 448 Economics of Labor and Human Resources (5) 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. Prerequisite, equivalent of 400, 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 the Department of Political Science as Political Science 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 the Department of History as HST 481. 200, 201 recommended.

#### ECON

#### 462 Economic History of the United States to

the Civil War (5) Systematic study of the changing pre-Civil War economic conditions and the consequences of these changes for the American society. Prerequisite, 201 or equivalent, or permission.

#### ECON

#### Economic History of the United States 463 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 devel-opment. 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 and 201 recommended.

#### **INTERNATIONAL TRADE**

#### ECON

#### Introduction to International Economics 370 (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 SYSTEMS** AND DEVELOPMENT

#### ECON

390 Comparative Economic Systems (5) Study of resource allocation, growth, and income distribution in capitalist, market socialist, and centrally planned economies. The theoretical models of these 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) W,S

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) Sp

Analytical survey of economic development of modern China, with special emphasis on the objectives, performance, and problems of the mainland Chinese economy under communism. Prerequisites, 200 and 201, or permission.

#### ECON

#### 494 Economic Growth of Japan Since 1850 (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

#### 481 Economic Statistical Analysis (5)

Applications of statistical techniques to economic problems. Prerequisites, 201 and 281, or equivalent, or permission.

#### ECON

#### 482 Advanced Economic Statistical Analysis (5)

Advanced applications of statistical techniques to economic problems. Prerequisite, 481 or equivalent, or permission.

#### GENERAL

#### ECON

#### 498 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 the Department of Political Science as Political Science 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 Cheung, Silberberg

Elements of choice theory. Value and demand, cost and supply, and the implied resource allocation under different constraints of competition. Prerequisites, 300, 301, and 410, or Mathematics 124, or permission.

#### ECON

#### 501 Microeconomic Analysis II (5) WSp Cheung, Parks

Theory of marginal productivity and the implied wealth distribution. The theory of capital and the implied resource allocation over time. Prerequisite, 500.

#### ECON

#### 502 Macroeconomic Analysis I (5) AW Hadjimichalakis, Silberberg

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 Mathematics 124, or permission.

#### ECON

#### 503 Macroeconomic Analysis II (5) WSp Hadjimichalakis, Kochin

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) W Seminar in advanced microtheory. Selected topics of special interest and significance. Prerequisites, 500, 501, 502, and 503.

#### ECON

#### 512 Advanced Macroeconomic Theory: Selected Topics (3, max. 12)

Seminar in advanced macrotheory. Selected topics of special interest and significance. Pre-requisites, 500, 501, 502, 503, and 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

### 555 Economics of Location (3)

Higgs

Application of economic theory in the explanation of spatial interrelationships, including the location of individual producers and consumers, spatial economic organization within regions and within cities, and locational aspects of economic growth. Prerequisites, 300 and 301.

#### GOVERNMENT REGULATION AND INDUSTRIAL ORGANIZATION

#### ECON

**530** Government Regulation of Business (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) Sp

#### Crutchfield, McGee

Advanced analysis of market structures and industry performance; selected empirical studies; principles of conservation and benefitcost analysis; issues in public policy. Prerequisite, 500 or permission.


### 535 Economics of Natural Resources I (3) W Brown, Crutchfield, Halvorsen

Pricing, allocation, and utilization of natural resources; externalities; public investment criteria; technological relationships; alternative strategies of public decision making; benefitcost analysis; case studies. Prerequisite, 435 or 500, or permission.

### ECON

### 536 Economics of Natural Resources II (3) Sp Brown, Crutchfield, Halvorsen

The second of two-course sequence. One applied area selected for particular emphasis. Students are expected to complete a substantial paper. Team projects are an option. Prerequisites, 435, 500, or permission.

### LABOR ECONOMICS

### ECON

541 Labor Economics (3) Hashimoto

Selected topics in labor economics. Prerequisite, permission.

### ECON

542 Labor Economics (3)

Gillingham, McCaffree, Rahm Selected topics in labor economics. Prerequisite, permission.

### ECÓN

### 546 Economic Studies of Health Care (3) Kessel, Lagace, McCaffree

Analysis of economic studies of health care, including-demand, manpower shortages, licensure price discrimination, optimum-size practices, cost indices and productivity, research, economic growth and health expenditures, and current national health policies. Offered jointly with the School of Public Health and Community Medicine as Health Services 546. Prerequisites, 400 or equivalent, and permission.

### ECON

### 556 Seminar in Urban Economics (3) Pollakowski

Use of economic theory to explain land-use trends, transportation, housing and renewal, the ghetto, and the public economy in urban areas. Offered jointly with the Department of Geography as Geography 556. Prerequisites, 300, 301, or equivalent.

### **PUBLIC FINANCE AND TAXATION**

### ECON

550 Public Finance I (3) W

Halvorsen

Theory of collective action: welfare economics, with special emphasis on public goods and external effects; theory of property rights, constitutions, and nonmarket decisions. Prerequisite, 500 or permission.

### ECON

### 551 Public Finance II (3) Sp Pollakowski

Welfare, allocative, and stabilization effects of taxation and public spending: theory of shifting and incidence of taxation; analysis of fiscal policy; problems of the public debt; 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

Higgs

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 Morris, North, Thomas

Economic growth of the Western world since the decline of the Roman Empire. Prerequisites, 504 and permission.

### **ECON**

562 American Economic History (3) Sp Higgs, North, Thomas

Analytical methods; sources and reliability of data; consideration of some major issues in current research. Prerequisites, 500 and 504, or permission.

### INTERNATIONAL TRADE

### ECON

### 571 International Trade Theory I (3) W Hadjimichalakis

Modern developments in general equilibrium theory and welfare economics, with relation to international trade. Prerequisite, permission.

### ECON

572 International Trade Theory II (3) Sp Hadjimichalakis

Problems of foreign trade and exchange controls, and international monetary policies. Prerequisite, permission.

### ECONOMIC SYSTEMS AND DEVELOPMENT

### ECON

504 Economic History and Economic Development (3) A

See Economic History 504 for course description.

### ECON

590 Theory and Practice of Economic Planning (3) W

Thornton

Theoretical issues and success criteria; models, techniques, and applications of planning in the allocation of economic resources. Prerequisite, permission. (Offered alternate years.)

### ECON

### 591 Theoretical Issues in Economic Development (3) W

Analysis of issues in economic development with application to the less-developed countries of the world today. Prerequisite, 504.

### ECON

595 Soviet Economics (3) Sp Thornton

Analysis of problems of economic measurement, economic development, resource allocation, planning and decentralization in the Soviet Union. Prerequisite, permission. (Offered alternate years.)

### MATHEMATICAL ECONOMICS

### ECON

# 513 Mathematical Economics: Activity

Analysis (3) A Hartman, Silberberg

Linear programming. Theory of convex bodies. Input-output models. Competitive equilibrium and Pareto optimum. Linear activity analysis of production and applications. Prerequisites, 412, 500, or permission.

### ECON

### 514 General Equilibrium Analysis (3) Bassett, Hadjimichalakis, Silberberg

Bassett, Hadimichalakis, Stoerberg Study of the existence, uniqueness, and stability of general equilibrium models under the assumptions of competition. Emphasis is on recent developments in the literature with consideration given to both positive and normative economics.

### ECON

### 515 Special Topics in Mathematical Economics (3) Sp Hartman

Seminar covers selected topics in mathematical economics. Emphasis is on providing access to existing literature, and on developing the logical thought and the techniques necessary if one is to contribute to the field. Prerequisite, permission.

ECON

### 517 Foundations of Economic Analysis (3) A Bassett, Hartman, Silberberg

Study of the sources of meaningful comparative statics theorems in economics, with special emphasis on extremum problems, qualitative analysis, and dynamic stability. Mathematical concepts necessary for access to the current literature are developed.

### STATISTICS AND ECONOMETRICS

### ECON

580 Econometrics I (3) A

Miller, Parks, Silberberg

Study of empirical estimation techniques and related methodological problems.

ECON

### 581 Econometrics II (3) W

Parks, Rao Advanced study of econometric methods and techniques. Prerequisites, 481, 482, and 580.

### GENERAL

### ECON

600 Independent Study or Research (\*) AWSp

### ECON

700 Master's Thesis (\*) AWSp

ECON

800 Doctoral Dissertation (\*)

### **ENGLISH**

### **Courses for Undergraduates**

The lists of names under various literature courses indicate the kind of material covered, but are neither comprehensive nor exclusive of other significant figures.





### ENGL

### 104-105 Introductory English (5-5) AWSp AWSD

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. Pre-requisites, 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 Department of Linguistics.)

### 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

### Advanced Written English for Foreign 303 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)**

Selinker, Trimble

Scientific and technical writing and reading for

foreign students well grounded in oral English. Concentration on (1) application of rhetorical concepts most frequently used in scientific and technical writing, (2) grammatical analysis in areas traditionally difficult for foreign students, and (3) grammatical-rhetorical analysis of scientific and technical discourse. Offered jointly with the College of Engineering as Human-istic-Social Studies 304.

### ENGL

### Scientific and Technical Report Writing 305 for Foreign Students (4) W

Selinker, Trimble

Application of the problem-solving approach to scientific and technical writing. Concentration on (1) undergraduate laboratory reports, (2) advanced grammatical analysis in areas traditionally difficult for foreign students, and (3) advanced grammatical-rhetorical analysis of scientific and technical discourse. Offered jointly with the College of Engineering as Humanistic-Social Studies 305. Prerequisite, 304 or Humanistic-Social Studies 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 (Formerly 258.)

### ENGL

212 Poetry (5) AWSp (Formerly 257.)

### ENGL

213 Drama (5) AWSp (Formerly 259.)

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. (Formerly 324.)

### ENGL

241 The Bible as Literature (5) AWSp Introduction to the development of the religious ideas and institutions of ancient Israel, with selected readings from the Old Testament and New Testament. Emphasis on reading the Bible with literary and historical understanding. (Formerly 390.)

### ENGL

### 251 Introduction to World Literature (5) AWSD

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.

### 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**

### ENGL

### 311 Chaucer (5) ASp

Chaucer's Canterbury Tales and other poetry, with attention to Chaucer's social, historical, and intellectual milieu. (Formerly 425.)

### ENGL

### 312 Medieval and Renaissance Drama, Exclusive of Shakespeare (5) A

Works by such dramatists as Kyd, Marlowe, Jonson, Webster, Beaumont, Fletcher, and Ford, with some medieval liturgical plays, cycles, and moralities. (Formerly 322.)

### ENGL

### 313 Renaissance Literature (5)

Poetry and prose by such writers as Wyatt, Surrey, Gascoigne, Spenser, Sidney, Marlowe, Drayton, Shakespeare, Lyly, Lodge, Nash, and Raleigh, with attention to the religious, intellectual, and literary contexts. (Offered alternate years.) (Formerly 321.)

### ENGL

314 Shakespeare to 1603 (5) AWSp Shakespeare's career as dramatist before 1603 (including Hamlet). Study of history plays, comedies, and tragedies. (Formerly 325.)

### ENGL

315 Shakespeare After 1603 (5) AWSp Shakespeare's career as dramatist after 1603. Study of comedies, tragedies, and romances. (Formerly 326.)

### ENGL

### 321 English Literature of the Seventeenth Century (5) W

Poetry and prose by such writers as Donne, Jonson, Herrick, Marvell, Herbert, Crashaw, Vaughan, Dryden, Edward Taylor, Bacon, Browne, Burton, Hobbes, and Bunyan, with attention to the religious, intellectual, and literary contexts. (Formerly 331.)

### ENGL

### 322 Milton (5) AWSp

Milton's early poems and the prose; Paradise Lost, Paradise Regained, and Samson Agonistes, with attention to the religious, intellectual, and literary contexts. (Formerly 332.)

### ENGL

323 English Drama, 1660-1800 (5) A Restoration and eighteenth-century plays by Dryden, Wycherley, Etherege, Congreve, Gold-smith, Sheridan, and others. (Formerly 323.)

### ENGL

324 Restoration Literature, 1660-1700 (5) Dryden and other satirists and playwrights, diarists, and essayists. (Offered alternate years.) (Formerly 335.)

### ENGL

### 325 Early Eighteenth-Century Literature (5) AWSp

Works by Swift and Pope and such other writers as Defoe, Addison, Steele, Gay, and Thomson. (Formerly 336.)

### ENGL

326 Later Eighteenth-Century Literature (5) ·AW

Works by Johnson, Boswell, and representative dramatists, novelists, and poets. (Formerly 337.)

### ENGL

### 327 English Novel: Eighteenth Century (5) AWSp

Defoe, Richardson, Fielding, Smollett, Sterne, early Jane Austen, and representative minor novelists. (Formerly 417.)

### ENGL

### 331 Romantic Poetry (5) AWSp

Blake, Wordsworth, Coleridge, and their contemporaries. (Formerly 341.)

### ENGL

### 332 Romantic Poetry (5) AWSp

Byron, Shelley, Keats, and their contemporaries. (Formerly 342.)

### ENGL

### 333 English Novel: Early and Middle

Nineteenth Century (5) AWSp Austen, the Brontes, Dickens, Thackeray, and other representative novelists. (Formerly 418.)

### ENGL

### 334 English Novel: Later Nineteenth Century (5) AWSp

Eliot, Hardy, Conrad, and other representative novelists. (Formerly 419.)

### ENGL

### 335 Victorian Poetry (5) A

Tennyson, Browning, Arnold, Hopkins, and such other poets as Hardy, D. G. Rossetti, Meredith, Clough, Morris, Wilde, and Yeats. (Formerly 344.)

### ENGL

### 336 Nineteenth-Century English Prose (5) ASp

Nonfictional prose by such writers as Burke, Coleridge, Wordsworth, De Quincey, Carlyle, Mill, Arnold, Newman, and Ruskin. (Formerly 347.)

### ENGL

### 341 Modern British Poetry (5) WSp

Hardy, Yeats, Eliot, Auden, and such other poets as Lawrence, Muir, Owen, Graves, Empson, Thomas, Larkin, Hughes. (Formerly 348.)

### ENGL

342 English Literature 1900-1930 (5) AWSp Works by Joyce, Yeats, Eliot, Lawrence, For-ster, Woolf, and others. (Formerly 430.)

### 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. (Formerly 431.)

### ENGL

### 351 American Literature: Beginnings to 1800 (5) W

Responses to the New World and literary strategies in the literature of the colonies and the early republic. Works by Taylor, Edwards, Franklin, and others. (Formerly 361.)

### ENGL

### 352 American Literature: Early Nineteenth Century (5) 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. (Formerly 362.)

### ENGL

### American Literature: Later Nineteenth Century (5) AWSp 353

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. (Formerly 363.)

### ENGL

### 354 American Literature: 1914-45 (5) AWSp

Works by such writers as Anderson, Lewis, Cather, O'Neill, Frost, Pound, Eliot, Cum-mings, Hemingway, Fitzgerald, Faulkner, Steinbeck, Hart Crane, Stevens, and Porter. (Formerly 434.)

### 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. (Formerly 435.)

### ENGL

# 356 American Poetry: Beginnings to 1917 (5)

### Poetry by Taylor, Whitman, Dickinson, and

326

such others as Emerson, Poe, Bradstreet, Freneau, Bryant, Longfellow, Crane, Robinson. The lineage and characteristics of lyric and epic in America. (Formerly 364.)

### ENGL

### 357 American Poetry Since 1917 (5) Sp Works by such poets as Frost, Stevens, Wil-liams, Pound, Moore, Eliot, Ransom, Cummings, Crane, Roethke, Bishop, and Lowell. (Formerly 365.)

### ENGL

### 358 The Literature of Black America (5) AWSp

Selected works by Afro-American writers, with emphasis on twentieth-century literature. (Formerly 369.)

### ENGL

### 361, 362, 363 Types of Contemporary Poetry (5,5,5) A,W,Sp

(Formerly 413, 414, 415.)

### ENGL

### 371 Modern European Literature in Translation (5) AWSp

Fiction, poetry, and drama from the develop-ment of modernism to the present. Works by such writers as Mann, Proust, Kafka, Gide, Hesse, Rilke, Brecht, Sartre, and Camus. (Formerly 437.)

### ENGL

### 372 Modern Jewish Literature in Translation (5) Sp

Survey of Jewish experience and its expression during the past hundred years. Typical writers studied are Sholom Aleichem, Peretz, Reisen, Babel, Kafka, I. B. Singer, Wiesel, Grade, Halpern, and Agnon. (Formerly 438.)

### ENGL

374 Study Abroad Program (5) Sp This course, for students in the Study Abroad program, relates major works of literature to the landscape and activities of its setting. (Formerly 301.)

### ENGL

### 375 Women and the Literary Imagination (5) AW

Study of women writers or ways various writers have portrayed woman's image, social role, psychology, etc.

### ENGL

### 376 Women Writers (5) WSp

Study of the work of women writers in English and American literature.

### ENGL

### 381 History of Literary Criticism (5) AWSp

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

### 391 English Grammar (5) AWSp

392 Current English Usage (5) W

Description of sentence, phrase, and word structures in present-day English. Open to sophomores. (Formerly 387.)

Principles for deciding what constitutes good

English in an individual's speech and writing.

### ENGL

(Formerly 388.)

### ENGL

393 History of the English Language (5) AWSp

Evolution of English sounds, forms, structures, and word meanings from Anglo-Saxon times to the present. Open to sophomores. (Formerly 447.)

### ENGL

### 394 English Prose Style (5) Sp

Analysis of the traits of language that con-tribute to the effects of writings in prose. (Formerly 449.)

### ENGL

### 395 American Writers: Studies in Major Authors (5)

Concentration on one writer or a special group of American writers.

### ENGL.

### 396 British Writers: Studies in Major Authors (5)

Concentration on one writer or a special group of British writers.

### ENGL

397 Topics in American Literature (5) Exploration of a theme or special topic in American literary expression.

### ENGL

398 Topics in British Literature (5)

Themes and topics of special meaning to British literature.

### ENGL

### 399 Special Studies in Literature (5)

Concentration on a theme or topic in literature, not confined by national boundaries or historical periods. (Formerly 499.)

### LITERARY HISTORY

Six courses (401-406) concerned with development of literary forms, subjects, and styles, with the associated intellectual tradition and social history. Students should have substantial preparation in the literature of the period.

### ENGL

401 English Literature: Beginnings to 1500 (5)

Recommended preparation: 241, 251, 261, 311, 312 (any two); or equivalent reading.

### ENGL.

402 English Literature: 1500-1660 (5) Recommended preparation: 312, 313, 314, 315, 321, 322 (any two); or equivalent reading.

### ENGL

### 403 English Literature: 1660-1780 (5)

Recommended preparation: 313, 314, 315, 321, 322, 323, 324, 325, 326, 327 (any two); or equivalent reading.

### ENGL

404 English Literature: 1780-1900 (5) Recommended preparation: 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.

#### Twentieth-Century British and American 406 Literature (5)

Recommended preparation: 341, 342, 343, 354,

355, 357 (any two, preferably one of 341, 342, 343, and one of 354, 355, 357); or equivalent reading.

### LITERARY TYPES AND GENRES

### ENGL

411 Types of Dramatic Literature: Comedy (5) W

Analyses of dramatic structures. American, British, and European plays representing the kinds of comedy from classical to modern. (Formerly 410.)

### ENGL

### 412 Types of Dramatic Literature: Tragedy (5) A

Analyses of dramatic structures. American, British, and European plays representing the nature of tragedy from classical to modern. (Formerly 411.)

### ENGL

413 Romances and Folk Literature (5) Medieval romance in its cultural and historical setting, with concentration on the evolution of Arthurian romance. (Offered alternate years.) (Formerly 423.)

### ENGL

### 414 The Popular Ballad (5)

The origin, development, and transmission of both texts and tunes of English and Scottish folk ballads in Great Britain and North America. (Offered alternate years.) (Formerly 424.)

### ENGL

# 415 Introduction to the Folktale Among

Literate Peoples (3) A Techniques of classification, Techniques of classification, geographic-historical distribution, theories of origin and interpretations, and related areas of investigation of the oral prose folk narrative of literate peoples. Offered jointly with the College of Engineering as Humanistic-Social Studies 471. Prerequisite, upper-division standing. (Formerly 471.)

### ENGL

416 Introduction to American Folklore (5) W Study of different kinds of folklore inherited from America's past and to be found in America today. The cultivation of an awareness of authentic folklore and of how to collect it. Offered jointly with the College of Engineering as Humanistic-Social Studies 472. (Formerly 472.)

### ENGL

417 Utopias and Social Ideals (5) Sp Reading of major works in the Utopian tradition of English and American literature, e.g., More, Utopia; Bellamy, Looking Backward; Mill, On Liberty; Huxley, Brave New World. (Formerly 426.)

### ADVANCED WRITING COURSES

### ENGL

#### **Special Studies in Expository** 421 Writing (5) WSp

Individual projects in nonfiction, including short biography, historical narrative, and opinion writing. Prerequisite, 271 or 272, or permission. (Formerly 451.)

### ENGL

### 422, 423, 424 Advanced Verse Writing (5,5,5) A,W.Sp

Intensive study of ways and means of making a sion. (Formerly 453, 454, 455.)

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### 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. (Formerly 457, 458.)

### 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. (Formerly 461, 462, 463.)

### ENGL

### 430, 431 Playwriting (5,5) Sp,Sp

Experience in planning, writing, and revising a play, whether from the outset, in progress, or in already completed draft. (Formerly 374, 375.)

### COURSES PRIMARILY FOR

### TEACHING CANDIDATES

### ENGL

441 The Composition Process (5) Sp Consideration of psychological and formal elements basic to writing and related forms of nonverbal expression and the critical principles that apply to evaluation. (Formerly 480.)

### ENGL

### 442 Language Learning (5) W

Consideration of how an individual achieves psychological and esthetic grasp of reality through language; relates language develop-ment to reading skills, literary interpretation, grammar acquisition, oral fluence, discursive and imaginative writing. (Formerly 481.)

### ENGL

### 443 Current Developments in English **Studies: Conference (5)**

(Formerly 482.)

### ENGL

### 444 Special Topics in English for Teachers (3-5, max. 10)

(Formerly 483.)

### CONFERENCES AND SEMINARS

### ENGI

### 490, 491 Major Conference (3,3) AWSp,AWSp

Individual study by arrangement with in-structor and approval of undergraduate chairman. For majors only.

### ENGL

### 492H Major Conference for Honors (5) ASp Individual study (reading, papers) by arrange-ment 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

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.

505 Graduate English Studies (5)

ENGL 506 Studies in Literary Genres (5, max. 15)

ENGL 507, 508 Literary Criticism (5,5)

ENGL 509 Methods of Contemporary Criticism (5)

ENGL 510, 511, 512 The Renaissance and Spenser (5,5,5)

ENGL 513 Shakespeare's Dramatic Contemporaries (5)

ENGL 515, 516 Chaucer (5,5)

ENGL 517, 518, 519 Shakespeare (5,5,5)

ENGL 521, 522, 523 Seventeenth-Century Literature (5,5,5)

ENGL 524, 525, 526 American Literature (5, max. 10; 5, max. 10; 5, max. 10)

ENGL 527, 528 Studies in Medieval Literature (5,5)

ENGL 530 The English Language (5)

ENGL 531 Introductory Reading in Old English (5)

ENGL 532 Advanced Reading in Old English (5)

ENGL 533 Foundations of American English (5)

ENGL 534 American English Dialectology (5)

ENGL

535 Comparative Grammars (5) Study in detail of one or more systems of grammar besides traditional grammar. Prerequisite, teaching experience.

### ENGL

538, 539, 540 Early Nineteenth-Century Literature (5,5,5)

ENGL

541, 542, 543 Victorian Literature (5, max. 10; 5, max. 10; 5, max. 10)

### ENGL

544, 545, 546 Eighteenth-Century Literature (5,5,5)

ENGL

547 Rhetoric (5)

ENGL

548 Twentieth-Century Literature (5)

### ENGL

553 Current Rhetorical Theory (5) Prerequisite, teaching experience.

### ENGL

561 English Literature, Beginnings to 1500 (5) Graduate survey for first-year graduate students.

### ENGL

562 English Literature, 1500-1660 (5) Graduate survey for first-year graduate students.

ENGL

563 English Literature, 1660-1780 (5) Graduate survey for first-year graduate students.

### ENGL

564 English Literature, 1780-1900 (5) Graduate survey for first-year graduate students.

### ENGL

565 American Literature, Beginnings to 1900 (5)

Graduate survey for first-year graduate students.

### ENGL

566 Anglo-American Literature, Twentieth Century (5)

Graduate survey for first-year graduate students.

### ENGL

580 Critical Approaches to Literary Texts (5) Prerequisite, teaching experience.

### ENGL

586 Graduate Writing Conference (5)

ENGL 599 Special Studies in Literature (5, max. 15)

ENGL 600 Independent Study or Research (\*)

ENGL 700 Master's Thesis (\*)

ENGL 800 Doctoral Dissertation (\*)

### ENVIRONMENTAL STUDIES

### **Courses for Undergraduates**

ENV S

### 210 Natural Processes in Ecosystems (5) W Fleming

Survey of climates and weather patterns, geological processes, natural selection, competition, predator-prey interactions, and dynamics of plant and animal communities. Intended for persons wishing to obtain a broad picture of the basic processes taking place in natural environments and of their implications for the kinds of manipulations and degradations of environments associated with human use of the land.

### ENV S

498 Special Topics in Environmental Studies (2-5, max. 20)

Lecture, seminar and/or team study with topics varying from quarter to quarter. Prerequisite, permission.

### ENV S

### **499** Undergraduate Research (\*, max. 20) Individual or team research of selected environmental topics. Prerequisite, permission.

### GENERAL AND INTERDISCIPLINARY STUDIES

Course numbers under this heading are reserved by the Division of General and Interdisciplinary Studies for curriculum innovations. Descriptions of GIS course offerings are available during preregistration and in-person registration in the Office for Undergraduate Studies, C14 Padelford.

### GENERAL STUDIES

### G ST

### 250 Project-Oriented Study (1-5, max. 10) AWSpS

For freshmen and sophomores only. Maximum of 15 credits in project-oriented study (General Studies 250 and 350) may be counted toward a degree in the College of Arts and Sciences.

### G ST

### 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

### 350 Project-Oriented Study (1-5, max. 15) AWSpS

For juniors and seniors. Maximum of 15 credits in project-oriented study (General Studies 250 and 350) may be counted toward a degree in the College of Arts and Sciences.

### G ST

### 391 Supervised Study in Selected Fields (\*, 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 (1-5) 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

Gartler, 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) AWSp Gallant, Hartwell, Roman, Sandler, Stadler

General course recommended for majors in the biological sciences and for those other students who are interested in the role of genetics in modern biology. Prerequisite, 10 credits in the biological or physical sciences or mathematics.

### GENET

### 452 Advanced Genetics (3)

Discussion course designed to follow 451. For students with an interest in further examining selected topics in general genetics. Prerequisite, 451.

### GENET

### 461 Genetics Laboratory (2) Sp

Doermann

Intended for students who desire laboratory experience in the use of genetic materials. Prerequisites, Genetics 451 or equivalent and organic chemistry.

### GENET

### 479 Laboratory Problems in Medical Genetics (9) AWSpS

Fialkow, Gartler, Motulsky In-depth work on a selected laboratory problem in medical genetics. Intended primarily for junior and senior medical students. Prerequisites, Human Biology 449 and permission.

### GENET

499 Undergraduate Research (\*) 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 al-ternate years; offered 1975-76.)

### GENET

### 551 Mutation and Recombination (3) A

First course in a three-quarter sequence in molecular genetics. Contributions of research with micro-organisms to an understanding of the molecular basis of mutation and recombination: life cycles, mutation rate, mutagenesis, structure of DNA molecules, fine-structure genetics, enzymology and genetics of recombination, DNA transformation. Prerequisite, 451 or permission.

### GENET

### 552 Information Transfer (3) W

Current understanding of the molecular mechanisms involved in the replication of genetic material and transfer of genetic information into RNA and protein molecules: enzymology and genetics of DBA 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<sup>2</sup> transcription from DNA, enzy-mology 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 syn-thesis 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. Prerequisite, permission.

### GENET

### 556 Bacteriophage Genetics (2) Sp Doermann

Inheritance mechanics of bacteriophages and structure and function of their apparatus are discussed. Molecular models derived from genetic data are emphasized. Prerequisite, permission.

### GENET

### 560 Chromosomal Behavior (3) W Sandler

Properties of meiotic chromosomes with special emphasis on recombination and segregation. Prerequisite, permission. (Offered alternate years; offered 1975-76.)

### GENET

### 561 Cytogenetics (3) W Roman

Discussion of cytological investigations of normal and aberrant chromosomal behavior, with particular reference to the structure of the chromosome and its response to mutagenic agents. Prerequisite, permission. (Offered alternate years; offered 1974-75.)

GENET

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GENET

### GENET

Hall

### 584 Genetic and Biochemical Analysis by Electron Microscopy (1-5)

Practical application of electron microscopic methods for determining cellular and macromolecular structure, with emphasis on genetic systems. Prerequisite, permission.

### GENET

600 Independent Study or Research (\*) AWSp8

### GENET

700 Master's Thesis (\*) AWSpS

GENET

800 Doctoral Dissertation (\*)

### **GEOGRAPHY**

### **Courses for Undergraduates**

Prerequisites: In addition to specified prerequisites for individual courses, students should also meet the general course level requirements as indicated by the numbers, except where they may have special preparation or background in geography or in related fields.

### INTRODUCTION TO GEOGRAPHY

### GEOG

100 Introduction to Geography (5) AWSp Major concepts and methods in the field; analysis of selected problems and types of regions. Honors sections available for honors students by permission.

### GEOG

### 200 Introduction to Human Geography (5) W 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 occupance.

### GEOG

### Economic Geography (5) AWSp Beyers, Boyce, Krumme, Thomas 207

Introductory analysis of the spatial order and changing locational patterns of man and his economic activities. Emphasis placed on concepts and theories pertaining to primary, sec-

### ARTS AND SCIENCES

Mathematical and experimental approaches to the genetics of natural populations, especially

as they relate to evolution. Prerequisite, permis-

583 Methodology in Biochemical Genetics (2)

Experiments and discussion sections on modern

research techniques used in biochemical ge-

562 Population Genetics (3) Sp

netics. Prerequisite, permission.

Felsenstein

ondary, and tertiary production, to transportation, and to the geography of consumption. Special attention given to cities and the distribution of activities within cities.

### GEOG

### 227 Historical Geography of Black America (3) W

Eichenbaum, Morrill

Study of the historical process of Afro-American migration and segregation in Afro-American settlement patterns in the United States; study of theories of the human use of space as related to Afro-American migration and settlement.

### GEOG

235 Geography of the Lesser-Developed World (5) Sp

Chang

Regional study of the underdeveloped world with special emphasis on the varying stages in, and major programs of, economic development in the well-populated areas of Asia, Africa, and Latin America and on the overriding problems confronting each.

### GEOG

258 Maps and Map Reading (2) AWSp Sherman, Youngman

Categories of maps and aerial photographs and their special uses; map reading and interpretation.

### GEOG

277 Geography of Cities (5) Sp 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 occupance 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

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, Velikonja

Study of the spatial variations and interrelationships of political activities and systems.

### GEOG

### 415 Agricultural Systems and Regions (3) Romanowski

Provides the student with a deeper understanding of the operation of farms, their spatial variation, and the methods of analysis of agricultural systems and regions. The student is expected to devote approximately twelve hours of time to supervised field work. The timing of field trips is arranged by the class. Prerequisite, 315 or permission.

### GEOG

### 416 Urban Economics (5)

Application of economic analysis to urban trends, problems, and prescriptions, such as changing urban form and function, urban public finance, housing and renewal, poverty and race, transportation, and environmental problems. Offered jointly with the Department of Economics as Economics 416. Prerequisite, Economics 300 or 400, or equivalent.

### GEOG

### 440 Regional Analysis (3 or 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. Lectures, 3 credits; independent study, 2 additional credits with permission. Prerequisite, 207 or permission.

### GEOG

### 441 Geography and Industrial Change (3 or 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. Lectures, 3 credits; independent study, 2 additional credits with permission.

### GEOG

### 442 Social Geography (5) A Morrill, Velikonja

Spatial patterns of population distribution and settlement; of migration and the spread of ideas; of social characteristics and social relations; social regions.

### GEOG

### 443 Location and Movement Models (3) 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 or 5) 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. Lectures, 3 credits; independent study, 2 additional credits with permission.

### GEOG

### 448 Geography of Transportation (3) W Ullman

Circulation geography, principles of spatial interaction emphasizing commodity flow, the nature and distribution of rail and water transport, the role of transport in area development.

### GEOG

### 449 Geography of Ocean Transportation (3 or 5)

Fleming

Geographic analysis of ocean trade routes, cargo and passenger flows, and port activities. Evaluation of the role of the transportation carrier in international trade. Lectures, 3 credits; independent study, 2 additional credits. Prerequisite, 207 or permission.

### GEOG

### 450 Theories of Location (3 or 5) W Beyers, Krumme, Morrill

Classical and neoclassical theories of location of agricultural, residential, industrial, and recreational activities, spatial equilibrium conditions for individuals, organizations, sets of activities, urban land use and settlement patterns, and associated networks focusing on the effect of transportation and transport costs. Course represents, in part, the history of thought in theoretical economic geography. Prerequisite, 207 or permission.

### GEOG

### 452 Location and Behavior (3 or 5) Sp Krumme

Principles governing individual and organizational behavior in space. Emphasis is placed on the interdependence of economic and noneconomic goals, aspirations, and other stimuli and constraints as they affect economic location and interaction decisions in urban and industrial settings. Behavioral frameworks are investigated as to their explanatory power for the analysis of spatial decision-making processes. Prerequisite, 450 or permission.

### GEOG

### 466 Regional Planning and Development (3 or 5) Sp Thomas

Emphasis placed primarily on the process of implementing regional development policies in economically advanced and lesser-developed countries. Resultant changes that occur in the distribution and structure of economic activities and settlement patterns are also studied and evaluated. Lectures, 3 credits; independent study, 2 additional credits with permission. Offered jointly with the Department of Urban Planning as Urban Planning 466.

### GEOG

475 Problems in Political Geography (5) W Jackson, Velikonja

Selected problems of spatial patterns and dynamic relationships. Geographical problems of regional, national, and international organization. Prerequisite, 375 or permission.

### GEOG

477 Urban Location and Structure (3) A 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 lickages, 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 Bevers

Survey of the economy of the Pacific Northwest in the light of factors of location, resources, resource-oriented industries, and resource policies. An introduction to regional studies on a local scale.

### GEOG

### 304 Western Europe (5) A Fleming

Analysis of the physical and socioeconomic characteristics of western Europe. Contempo-

rary political and economic integration trends are evaluated in their regional context.

### GEOG

305 Eastern Europe (5) W Romanowski, Velikonja

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

Boyce, Eichenbaum Spatial pattern of economic and social life in

### America—how it evolved, the role of the environment and resources; problems of regional inequality in development.

### GEOG

### 404 Problems in the Geography of Western Europe (3 or 5) Sp

Fleming

Emphasis on problems stemming from contemporary political and socioeconomic changes under way in Europe. Topics include urbanization, regional development, economic integration and patterns of trade. Lectures, 3 credits; independent study, 2 additional credits with permission.

### GEOG

### 405 Problems of Eastern Europe (5) A Romanowski, Velikonja

Analysis of selected geographical aspects of Eastern Europe. Natural and human resource base, social and political organization. Their relationships and interdependence. Prerequisite, 305 or permission.

### GEOG

433 Soviet Resource Use and Management (5) Implications of Soviet industrial growth for resources; use of resources and associated problems; conservation in theory and practice.

### ARTS AND SCIENCES

### GEOG

434 Problems in the Geography of Southeast Asia (5)

Analysis of regional and political structures; resources, economic activities, and problems of development; overseas and internal relationships.

### GEOG

### 435 Problems in the Geography of China (5) A

Chang Origins and development of Chinese civilization in its geographic base and areal spread; political China and the Chinese sphere; physical base and resources; problems of agriculture, population, industrialization, urbanization, transportation, and contemporary development; communist China.

### GEOG

### 437 Problems in the Geography of Japan (3 or 5) Sp Kakiuchi

Regional structure of Japanese urban, industrial, and agricultural geography. Analysis of contemporary patterns considering cultural and physical factors and selected aspects of their historical development. Lectures, 3 credits; independent study, 2 additional credits

### GEOG

### 438 Soviet Regions and Regionalization (3 or 5) Sp

### Jackson

with permission.

Evaluation of prerevolutionary and Soviet efforts to determine a basis for subdividing Russia into regions, together with an analysis of contemporary Soviet regions and their economic development. Lectures, 3 credits; independent study, 2 additional credits with permission. Prerequisite, 333 or permission.

### 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 (3 or 5) W

### Youngmann

Introduction to the origins, development, and methods of automated cartography. Experiments with a user-oriented package of computer mapping programs capable of performing most thematic mapping operations. Requires normal use of the Computer Center with special emphasis on the CALCOMP plotter, line-printer, and cathode-ray tube (CRT) display. Students who have taken General Engineering 115 or Engineering 141 can take 365 for 3 credits. Prerequisites, 360 and a computer programming course, or permission.

### GEOG

### 430 Map Projections (3) W

Veress

Classification of projections, theory of distortion. Projection from ellipsoid to sphere. Theory of conformal projections (Lambert, Mercator, stereographic). Equal area projections. Polyconic and other projections. Offered jointly with the Department of Civil Engineering as CETC 430. Prerequisite, permission.

### GEOG

# 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 the College of Education as EDC&I 467.

### INTRODUCTORY RESEARCH TECHNIQUES

### GEOG

### 426 Quantitative Analysis of Spatial Distributions (5) A

uisite, basic statistics course.

Morrill, Youngmann 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. Prereq-

### 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, Velikonja

### 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 Information Systems for Planning and Research (3) A Horwood

Computer programming technology and data systems design for large-scale data inputs. Machine editing, data manipulation, and information retrieval. Laboratory problems adapted to specialized interests of students. No previous computer programming experience required. Offered jointly with the Department of Civil Engineering as CETC 527 and with the Department of Urban Planning as Urban Planning 527.

### GEOG

### 528 Automated Mapping and Graphing (3) W Horwood

Computer applications to statistical and areal analysis. Laboratory problems adapted to specialized interests of students. Offered jointly with the Department of Civil Engineering as CETC 528 and with the Department of Urban Planning as Urban Planning 528. Prerequisites, basic statistics and 527 or permission.

### GEOG

### 529 Computer Applications to Urban and Regional Analysis (3) Sp Horwood

Simulation models and automated systems for the study of land use and related economic and demographic data. Machine methods of planning analysis and feedback review. Laboratory projects. Offered jointly with the Department of Civil Engineering as CETC 529 and with the Department of Urban Planning as Urban Planning 529. Prerequisite, 528 or permission.

### GEOG

- 533 Research Seminar: Soviet Union (3, max.
  6) AW
  Jackson
  - .....

### GEOG

538 Research Seminar: Geography of Transportation (3, max. 6) Ullman

### GEOG

539 Research Seminar: Utilization of Water Resources (3, max. 6)

### GEOG

540 Research Seminar: Industrial Geography (3, max. 6) Sp Beyers, Krumme

### GEOG

542 Research Seminar: Social and Population Geography (3, max. 6) W Morrill, Velikonja

Morrill, Velikonja Prerequisite, graduate standing.

### GEOG

### 550 Research Seminar in Location Theory (3) W

### Beyers, Krumme

Discussion of selected research-oriented topics in classical, neoclassical, and behavioral location theory. Theoretical problems of locational analysis. Relationships between location theory and regional development and planning concepts. Location concepts for urban analysis. Prerequisite, permission.

### GEOG

### 552 College Teaching of Geography (2, max. 6) AWSp

General instructional strategies, including expository and inquiry approaches, together with use of media. Explanation in geography and geographic theory and principles as the basis of instructional sequencing. Prerequisites, appointment as a teaching assistant in the Department of Geography and permission. (Not offered 1975-76.)

# G

### GEOG

### Seminar in Urban Economics (3) W 556 Pollakowski

The use of economic theory to explain land-use trends, transportation, housing and renewal, the ghetto, and the public economy in urban areas. Offered jointly with the Department of Economics as Economics 556. Prerequisites, Economics 300, 301, or equivalent.

### GEOG

### 566 Regional Planning Seminar (3) Thomas

Regional planning and development theories and methodologies. Critical evaluation of regional planning in selected economically advanced and lesser-developed countries. Offered jointly with the Department of Urban Planning as Urban Planning 566. Prerequisites, 466 and graduate standing.

### GEOG

#### 567 **Research Seminar: Geography and** Development (3, max. 6) A

Thomas

Offered jointly with the Department of Urban Planning as Urban Planning 567. (Formerly 530.)

### GEOG

### 570 **Research Seminar: Natural Resources** Analysis (3, max. 6) W

Prerequisite, graduate standing.

### GEOG

575 Research Seminar: Political Geography (3, max. 6) 🧭 Velikonja

### GEOG

577 Research Seminar: Internal Spatial Structure of Cities (3, max. 9) ASp Bovce

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**

### GEOL

**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.

### GEOL

### 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.

### GEOL

103 History and Ancient Environments of Life (5) Sp

Rensberger, Wheeler Introduction to the evolution of life and its environments as documented in the rocks through geologic time, three billion years ago to the present.

### GEOL

106 Geology in World Affairs (5) A Geological occurrence, world distribution, and production of coal, petroleum, and the impor-tant industrial materials. With laboratory. For nonscience majors. Prerequisite, 101.

### GEOI.

### 205 Introduction to Geological Sciences (5) AW

Introduction to geology, with laboratory, for science majors, with emphasis on the physics, the chemistry, and the history of the earth. Not open to students who have taken 101. Prerequisite, a background in physics, chemistry, and mathematics is desirable.

### GEOL

301 Introduction to Field Geology (5) S Introduction to methods of geologic field study. Taught from off-campus field camp during September. Registration is Summer Quarter. Prerequisite, major standing in geological sciences or geological oceanography, or permission.

GEOL

**308 Geology of the Northwest (5) SpS** Geologic history of Washington, Oregon, and Idaho. Emphasis on use of geologic principles in interpreting evidence found in landscape and rocks. Prerequisite, 101 or 205, or equivalent.

### GEOL

### 311 The Earth's Surface (4) A

Dunne, Porter

Dynamic role of physical geologic processes operating at the earth's surface in the development of surface features and environments. Climatic control of processes and the effect of climatic variations on landscape evolution; human effects and environmental management are stressed.

### GEOL

320 Mineralogy (5) AW

Christensen, McCallum Introduction to mineralogy, including elementary crystallography (lattice types, external morphology, stereographic projection), elementary crystal physics (relationship of physical properties, including tensor properties to crystal symmetry), and elementary crystal chemistry (structures, bonding, etc.), especially of the silicates. Prerequisite, Chemistry 101 or 140.

### GEOL

### 321 Principles of Petrology (5) Sp Evans

Description, classification, and origin of ig-neous, metamorphic, and sedimentary rocks, with laboratory hand specimen study of rock specimens. Two one-day field excursions. Pre-requisite, 320 or equivalent.

### GEOI.

### 340 Structural Geology (5) Sp Cowan

Interpretation of rock structures and their genesis. Prerequisite, 321 or permission.

### GEOL

#### The Earth's Interior (3) W 341

Bostrom, Stuiver

Introduction to geophysics of solid earth, including thermal processes, seismology, and earth structure, the earth's gravity and magnetism, tectonics, geochronology, and the origin and chronologic development of the earth.

### GEOL

### 361 Surface Deposits and Fossils (5) W Whitney

Basic concepts of stratigraphy and paleontology and the interpretation of geologic history.

### GEOI

401, 402 Field Course (\*, max. 15; \*, max. 15) Off-campus field work in general geology, emphasizing geologic mapping and report writing. No more than 15 credits in 401, 402 combined will be allowed. Prerequisite, major in geological sciences with senior standing or permission.

### GEOL

### 405 Interpretation of Geophysical Data (5) Sp Bostrom

Interpretation of geophysical data, including signal separation utilizing harmonic analysis and linear operators. Individual data may be used by arrangement with instructor. Prerequisites, 341 and calculus to level of partial differential equations. Course is complementary to Geological Sciences 450.

### GEOL

### 406 General Seismology (5) Bostrom

Ray theory analysis applied to an inhomogeneous earth; travel time analysis; observational seismology, instruments, quantitative measurement of earthquakes; properties of earth's interior; tectonic significance of earthquakes. Prerequisite, 341.

### GEOL

### 411 Fluvial Geomorphology (3) Sp Dunne

Hydraulic and dynamic characteristics of streams, morphology of drainage basins, landscape evolution by stream sculpture and deposition, and climatic implications of changes in stream regimen. Prerequisite, senior standing.

### GEOL

414 Photogeology (3) W

# Porter

Geologic interpretations of aerial photographs with emphasis on solving field problems. Prerequisites, 340, 461, or equivalent. (Offered odd-numbered years.)

### GEOŁ

### 415 Principles of Glaciology (4) A LaChapelle, Porter, Raymond, Stuiver,

Untersteiner, Washburn

Structure and properties of snow and ice: snow metamorphism, avalanches, heat and mass balance of valley glaciers, glacier structure and flow dynamics, continental ice sheets, sea, lake, and river ice, frozen ground, methods of paleoclimatology, and Ice Age theories. Offered jointly with the Geophysics Program as Geo-physics 415. Prerequisites, upper-division standing and permission.

### GEOL

Glacial Geology (4) A 416

Porter, Washburn

Interpretation of glacial history through study of sediments and landforms, with emphasis on climatic implications, chronology, and correlation. Prerequisite, senior standing or permission.

### GEOL

#### 417 The Late Cenozoic Glacial Ages (3) Sp Porter

Physical and biological evidence, both terres-trial 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 poten-tial for predicting future climatic variations. Offered jointly with the Quaternary Research Center as Quaternary Studies 417.

### GEOL

# 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.)

### GEOL

### 423 Optical Mineralogy (4) A Vance

Petrographic microscope and recognition of common minerals in thin section. Prerequisite, 320 or equivalent.

### GEOL

### 424 Petrography and Petrology of Igneous Rocks (5) W

Vance

Systematic study of igneous rocks and their origin, using the petrographic microscope. Prerequisite, 423 or equivalent.

### GEOL

#### 425 Petrography and Petrology of Metamorphic Rocks (5) Sp

Vance Systematic' study of metamorphic rocks and their origin, using the petrographic microscope. Prerequisite, 423 or equivalent.

### GEOL

### 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.

### GEOL

### 430 Macroscopic Invertebrate Fossils (5) A Mallory

Systematic study of invertebrate fossils and the principles of paleontology. Prerequisite, 101 or 205, or equivalent. (Offered even-numbered years.)

### GEOL

### 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.)

### GEOL

### 437 Evolution of the Vertebrates (5) W Rensberger

Introduction to the osteology and evolution of the major groups of vertebrates. Prerequisite, 103 or Biology 101 of 210. (Offered evennumbered years.)

### GEOL

### 438 Evolution and Classification of the Mammals (5) W

Rensberger Evolutionary changes and classification of the major groups of mammals from the Mesozoic to the present. Prerequisite, 437 or equivalent. (Offered odd-numbered years.)

### GEOL

#### Advanced Structural Geology (5) A 443 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

#### Techniques in Geophysics (3) A 450 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

### 462 Interpretation of Geologic History

(5) W Wheeler

Regional and interregional integration of physical geology and biostratigraphy as basis for geologic history of North America. Pre-requisites, 430 and 461, 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, Chemistry 160, or equivalent.

### GEOL

#### Elements of Geochemistry (4) A 472 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 Geological X-ray Methods (3) W

Gresens

Introduction to the routine analysis of geologic materials by the methods of X-ray diffraction

and fluorescence spectroscopy, with laboratory. Prerequisite, senior standing or permission.

### GEOL

### 480 History of Geology (3)

Study of the contribution of individuals to the evolution of geological concepts. Prerequisite, senior standing in geological sciences or permission.

### GEOL

### 481 Mineral Industry Economics (3) W Cheney

World mineral resources, their distribution, exploitation, and depletion, social economic and political effects, international control and and political effects, international control and trade, industrial organization, government policies, taxation, tariffs, marketing, and pricing; elements of production costs. Pre-requisites, 205, Mining Engineering 322, or permission. Offered jointly with the Depart-ment of Mining, Metallurgical, and Ceramic Engineering as Mining Engineering 481.

### GEOL

#### 486 Economic Geology of Sedimentary Rocks (5) A

Chenev

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

#### Economic Field Geology (4) Sp 488 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 tech-niques 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

Advanced Studies in Geomorphology and Pleistocene Geology (\*, max. 10) AWSp 510 Porter, Washburn

### GEOL

511 Seminar in Geomorphology (\*) AWSp Porter, Washburn

### GEOL

- Seminar in Pleistocene Research (2) 512 AWSp
  - Porter, Washburn

### GEOL

#### Quaternary Stratigraphy of the Western 513 Hemisphere (3)

Quaternary stratigraphy of North and South America, Antarctica, and Greenland. Emphasis on glacial record of North America and on nonglacial record of selected areas throughout the hemisphere. Offered alternate years jointly with the Quaternary Research Center as Quaternary Studies 513.

### GEOL

#### Quaternary Stratigraphy of the Eastern 514 Hemisphere (3)

Quaternary stratigraphy of Europe, Africa, Asia, and Pacific islands. Emphasis is on European glacial record and on nonglacial record of South Asia and Africa. Offered jointly with the Quaternary Research Center as Quaternary Studies 514.

### GEOL

### 516 Advanced Problems in Glacial Geology (3) Sp

Porter

Field and/or laboratory investigations of selected glacial geologic problems, with emphasis on the Pacific Northwest.

### GEOL

### **Advanced Problems in Periglacial** 518 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

Advanced Studies in Crystallography, 520 Mineralogy, and Petrology (\*) AWSp

### GEOL

#### Metamorphic Minerals (5) W 521 Misch

Nature and paragenesis of metamorphic minerals; physical, chemical, and geological interpretation of paragenesis. Prerequisite, 425 or equivalent. (Offered alternate years.)

### GEOL

### 522 Metamorphic Processes (5) W Misch

Deformation and crystallization, migmatization, and mobilization. Prerequisite, 425 or equivalent. (Offered alternate years.)

### GEOL

#### 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, Chemistry 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

### 530 Seminar in Advanced Invertebrate Paleontology (\*, max. 9) A Mallory

### GEOL

531 Stratigraphic Paleontology (5) Sp Mallory

Principles of stratigraphic paleontology and chronologic biostratigraphy. Prerequisites, 430, 461, or equivalent. (Offered odd-numbered years.)

### GEOL

### 532 Paleoecology of Invertebrates (5) Sp Mallory

Properties of fossil populations and interpre-tation 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

540 Advanced Studies in Structural Geology (\*) AWSp

McKee, Misch

### GEOL

### 545 Structure of Europe (5) Sp Misch

Structural evolution and geotectonics of Europe. (Offered alternate years.)

### GEOL

546 Structure of Asia and West Pacific Rim (5) Sp

### Misch

Structural evolution from Central Asia to West Pacific: geotectonic principles. (Offered alternate years.)

### GEOL

547 Literature on Structural Geology (3 or 5)

### 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

335

deformation; experimental deformation of rocks; applications to dynamic analysis of tectonites. Course content varies from year to year. Prerequisite, 449. (Offered odd-numbered vears.)

### GEOL

#### Studies in Geophysics (\*, max. 9) AWSp 550 Bostrom, Christensen, Crosson

### GEOL

### 553 Physical Properties of Earth Material (3) Sp

### Christensen, Crosson

Composition of rocks; mechanical, thermal, magnetic, and electrical properties of rocks; tensor properties of crystals; measurement of rock properties at high pressures and temperatures. Offered jointly with the Geophysics Pro-gram as Geophysics 553. Prerequisite, Aeronautics and Astronautics 567 or equivalent.

### GEOL

### 560 Advanced Studies in Stratigraphy (\*) AWSp

Mallory, Wheeler

### GEOL

West Coast Cenozoic Stratigraphy (5) Sp 563 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 evennumbered years.)

### GEOL

### 568 Mesozoic Stratigraphy (5) Sp Wheeler

North American Mesozoic stratigraphy as a basis for interpretation of regional and interreepisodes. (Offered oddgional geologic numbered years.)

### GEOL

### 570 Advanced Studies in Geochemistry (\*) AWSp

Evans, Gresens, McCallum

### GEOL

### 571 Engineering Geology (3) W

Coombs

Geologic principles as applied to large engineering projects. Emphasis is on the physical properties of rocks and their relation to contemplated engineering structures.

### GEOL

# 573 Application of Microprobe Techniques (4) W

Principles, methods, and applications of dating

Advanced Studies in Sedimentology (\*)

Lectures, discussions, and readings on selected

Evans

AWSp

### GEOL

GEOL

GEOL

580

576 Geochronometry (4) A Stuiver

rocks and organic materials.

Stewart, Whetten

Stewart, Whetten

problems of current interest.

582 / Seminar in Sedimentology (2) W

### **GEOL**

585 Advanced Studies in Economic Geology \*) AWSp Cheney, Coombs

### GEOL

#### Advanced Economic Geology (4) A 587 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 to problems using the techniques of potential theory. Eigenfunction expansions, spherical harmonic analysis, and Laplace transform theory are applied to problems related to the earth's gravity field, earth tides, and heat flow in the earth. Prerequisite, Mathematics 238 or equivalent 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 oceanog-raphy. Prerequisite, Mathematics 238 or equivalent.

### GPHYS

### 405 Geophysical Continuum Mechanics (3) Ŵ

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 ma-terials. Prerequisite, Mathematics 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 the Department of Atmospheric Sciences as Atmospheric Sciences 406. Prerequisite, 404 or permission.

### GPHYS

### 407 Geophysics: Space (3) Sp

Survey of various phenomena occurring in the outer regions of the earth's atmosphere, the ionosphere, the magnetosphere, and the Van

Allen radiation belts. Behavior of charged particles in the geomagnetic field and simple concepts of plasma and magnetohydromagnetic waves. Prerequisite, Physics 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 the Department of Geological Sciences as Geological Sciences 415. Prerequisites, upper-division standing and permission.

### GPHYS

501 Earth Potential Fields (3) A

Booker, Lister Application of potential theory to the 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 Crosson, 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

Crosson

Theory and practical application of data collection and analysis applied to geophysical problems. Digital processing of signals; filtering and spectral analysis. Two-hour laboratory session includes problem solving on computerbased 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 in-terpretation. Prerequisites, 504 and permission.

### **GPHYS**

### 510 Physics of Ice and Snow (3) A Hobbs

Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from the vapor and liquid phases. Physical properties of snow. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 510. Prerequisite, permission.

### **GPHYS**

### 511 Glaciology I: Formation of Snow and Ice Masses (3) W Raymond

Snow climatology. Transport of snow by wind. Transfer of radiative, sensible, and latent heat at the surface of snow and ice. Freezing of natural water bodies. Heat and mass budget of ice masses. Theories of ice ages. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 511. Prerequisite, 510 or permission.

### GPHYS

### 512 Glaciology II: Dynamic Glaciology (3) Sp Raymond

Rheology of ice. Internal deformation and sliding of glaciers. Thermal regime of glaciers. Steady flow, dynamic response to changing climate, and surges. Deformation and drift of sea ice. Snow and avalanche dynamics. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 512. Prerequisites, 510, 511, or permission.

### **GPHYS**

# 513 Glaciology III: Structural Glaciology (3)

### Raymond, Untersteiner

Snow metamorphism and primary layering. Dynamic metamorphism, flow structures, and relation to ice deformation. Structure of river, lake, and sea ice. The role and behavior of foreign matter. Physical processes of structural change and relationship between structures and bulk physical properties. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 513. Prerequisites, 510, 511, 512, or permission.

### GPHYS

### 514 Field Glaciology (6) Sp

Lachappelle, Raymond, Untersteiner Structure and metamorphism of snow cover. Energy exchange at melting snow and ice surfaces. Deformation and flow of glaciers. Climatology and mass budgets. Glacier features. Emphasis on instrumentation, field techniques, and data analysis. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 514. Prerequisite, 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 the Department of Atmospheric Sciences as Atmospheric Sciences 531. Prerequisite, Physics 320.

### GPHYS

### 535 Introduction to Plasmas in Geophysics (3)

Kinetic theory of ionized gases, phase space distribution, magnetohydrodynamics of con-ducting 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

# G

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, Physics 426 or Aeronautics and Astronautics 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 the Department of Atmospheric Sciences as Atmospheric Sciences 539. Prerequisite, Atmospheric Sciences 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 Mathematics 569 or equivalent.

### **GPHYS**

### 552 Theoretical Seismology (3) W Crosson

Wave motion in uniform and layered elastic solids, dispersion, surface waves, modal analysis; inhomogeneous and anisotropic media; effects of anelasticity, gravity, and curvature, eigenvibrations of the earth. Prerequisite, Aeronautics and Astronautics 546.

### **GPHYS**

### 553 Physical Properties of Earth Material (3) Sp

### Christensen, Crosson

Composition of rocks; mechanical, thermal, magnetic, and electrical properties of rocks; tensor properties of crystals; measurement of rock properties at high pressures and temperatures. Offered jointly wilh the Department of Geological Sciences as Geological Sciences 553. Prerequisite, Aeronautics and Astronautics 567 or equivalent.

### **GPHYS**

### 554 Earth Rotation and Tidal Forces (2) Sp Bostrom

Causes and consequences of changes in the rotation of the earth.

### GPHYS

571 Gravity and Geomagnetic Interpretation
(3) A

Lewis

Fundamental concepts; the earth's magnetic field; instrumentation and reduction of magnetic measurements, interpretation of magnetic data; gravity measurements, reduction of gravity observations; interpretation of gravity anomalies. Offered jointly with the Department of Oceanography as Oceanography 571. Prerequisites, Mathematics 324, Physics 323, or equivalents or permission.

### **GPHYS**

572 Geodynamics (3) A

Lister

Qualitative discussion of the processes that cause crustal movement, viewed on a global scale, and the techniques used to investigate these processes. Prerequisite, permission.

### **GPHYS**

573 Terrestrial Magnetism (3) Sp Merrill

Advanced aspects of earth magnetism intended for specialists in this field. Extensive discussion of origin theories and their implications; physical basis and theories of magnetism in rocks; paleomagnetic techniques and results. Offered jointly with the Department of Oceanography as Oceanography 573. Prerequisite, permission.

### **GPHYS**

### 574 Tectonophysics (3) A

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, permission.

### GPHYS

### 580 Special Topics in Geophysics (2-6, max. 12) Sp

Intensive treatment of a selected topic in geophysics presented by lectures or seminars for students in geophysics and related special fields. Subject is selected from all areas in geophysics and varies from year to year. Prerequisite, graduate standing or permission.

### **GPHYS**

600 Independent Study or Research (\*) AWSp

### GPHYS

700 Master's Thesis (\*) AWSp

GPHYS

800 Doctoral Dissertation (\*)

### GERMANIC LANGUAGES AND LITERATURE

### **Courses for Undergraduates**

GERM

101, 102, 103 First-Year German (5,5,5) AWS,AWSpS,AWSp

The methods and objectives are primarily audiolingual, with emphasis on speaking and listening. Secondary objectives are reading and writing.

### GERM

### 111, 112, 113 First-Year German (5,5,5) 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.

### GERM

### 121, 122 First-Year Reading German (5,5) AS,WS

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

### 130 Conversational German Through Films (2, max. 6) AWSp

Conversational German in everyday situations, based on a widely acclaimed German film series. Of special use to travelers. Stress is on oral German, with conversation practice in small groups. Although the series progresses through the year, beginners may enroll in any quarter.

### GERM

### 201 Basic Second-Year German (5) AWSpS

Readings and oral practice in German, plus grammar review. Prerequisite, 103 or equivalent.

### GERM

### 202 Intermediate Second-Year German (5) AWSpS

Continuation of 201. Prerequisite, 201 or equivalent.

### GERM

### 203 Advanced Second-Year Reading (3) AWSp

Introduction to classics of German literature. Majors and minors take concurrently with 207. Prerequisite, 202 or equivalent.

### GERM

207 Advanced Second-Year Conversation (2) AWSp

Discussion of general topics to develop oral fluency. Prerequisite, 202 or equivalent.

### GERM

### 211 Basic Second-Year Reading (5) AW

Primary emphasis is placed on the reading skill. The active reproduction of German is deemphasized. 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. 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

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 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) AWSpS 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) AW,WSp,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 Germanspeaking countries; primarily for majors and minors. 301: emphasizes phonetics and vocab-ulary 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, Böll, 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

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

#### History of the German Language (3) SpS 404 Barrack, Voyles

From early Germanic to the present. Open to junior majors. (Offered Summer Quarter 1976.)

### GERM

### 405 Linguistic Analysis of German (3) ASpS Barrack, Voyles

Prerequisite, third-year German, or permission. (Offered Summer Quarter 1974.)

### 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 histori-cal consideration of works by Novalis, Brentano, Eichendorff, Heine, Kleist, Buchner, T. A. Hoffman, Grillparzer, and others. E. 411: Nineteenth Century Realism: literature from 1830 to 1890, with esthetic and histori-cal 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 Hoddis, and others. Prerequisite, for either 410, 411, or 412, 15 credits in thirdyear 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 Caro-lingian and Cluniac Periods, the Court Epic, the Heroic Epic, the Spielmannsepik, the Minnesang, the poetry of the epigones who followed the Age of High Chivalry, the German Mystics, and the Ackermann aus Bohmen. 414: Literature of the Sixteenth, Seventeenth, and Early Eighteenth Centuries: esthetic and historical consideration of works by Erasmus, Luther, Hans Sachs, the Historia von Dr. 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

#### **Teaching of College-Level German** 473 (1, max. 9) AWSp

For conversation proctors in 130.

### GERM

### Special Topics in the Teaching of 479 Foreign Languages (3, max. 9) S

Intensive workshop for inservice and pre-service teachers of all foreign languages on some aspect of foreign-language teaching methodology. Prerequisite, foreign-language teaching experience or participation in a previous foreign-language methods course.

### GERM

490 Contemporary German Literature (3) A Interpretation of selected works by contemporary German authors. A senior colloquium for majors. Prerequisite, permission.

### GERM

### 491 Studies in German Poetry (3) W McLean

Introduction to various methods of inter-pretation 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) Allard

In-depth study of Hermann Hesse prior to the impact of World War I and Jungian psychology on his life and work. Primary emphasis is placed on his earlier novels and poetry as they relate to German romanticism and to the subsequent development of his literary motifs.

### GERM

### 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) South

Intensive study of the short stories and novels of Franz Kafka in English translation; emphasis on philosophical relevance and esthetic significance.

### GERM

342 Thomas Mann in English (3) 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

#### The Theme of God's Death in German 343 Thought in English (3) E. Behler

Course devoted to the discussion of the great controversies about the traditional concept of

God, pantheism, atheism, and nihilism, which mark German thought and literature since the late eighteenth century and throughout the nineteenth century.

### GERM

344 The Late Hesse in English (3) Allard

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 of the course.

### 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) Allard

Historical survey of the quest for the mystical in German literature and philosophy from the Middle Ages to the twentieth century.

### GERM

### Love and Adventure in German Courtly. 348 Literature in English (3) Hruby

Study of medieval literary, social, and in-tellectual trends from 1150 to 1250 as reflected in representative works of that period, such as poetry of the Minnesanger and courtly epics.

### GERM

Goethe in English (3) 349 Ammerlahn

Study and interpretation of selected major works (especially Faust) of Goethe, whose literary, philosophical, and scientific achieve ments 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

The Image of Woman in German 360 Literature in English (3)

D. Behler

The image of woman as a reflection of the prevailing social attitudes on various periods of German literature.

### GERM

370 Man's Quest for Meaning in **Contemporary Thought in English (3)** E. Behler

Search for meaningful existence in contemporary thought. The main goal is to present this aspect of modern life to a broader community of students and to discuss with them problems that constitute a challenge to an understanding of ourselves.

### **Courses for Graduates Only**

### GERM

500 Methods and Ideologies of German Literary Criticism (3) W South

(Offered 1974-75.)

### GERM

501 Bibliography (3) A

### GERM

History of German Criticism (3) W 502 E. Behler

### GERM

Modern Poetry (3) A 503 Rev

(Offered 1975-76.)

### GERM

506 German Syntax and Semantics (3) WS Allard, Voyles

Advanced structural analysis of German grammar, with special emphasis on the application of descriptive techniques. (Offered Summer Quarter 1975.)

### GERM

### 510, 511, 512 German Civilization (3,3,3) AS,WS,SpS

Esthetic and historical presentation of modern German civilization with due emphasis on its cultural, political, and social aspects. Prerequisite, permission. (Offered in consecutive Sum-mer quarters; 510 offered Summer Quarter 1974.)

### GERM

513 Germany Since 1918: Study in German Fiction and Thought (3) SpS

German intellectual life since 1918. A study in German fiction and thought in relation to the cultural, political, and social aspects of the period. (Offered Summer Quarter 1974.)

### GERM

- 515 Romanticism (3) Sp
- D. Behler

### GERM

Nineteenth-Century Drama (3) W 516 South

### GERM

Nineteenth-Century Prose (3) W 517 Galt, Hertling

### GERM

518 Twentieth-Century Literature (3) Sp Rey

### GERM

520 Contemporary German Literature (3)

### GERM

521 Seminar in the Literature of the **Reformation and Renaissance (3)** 

Hruby (Offered 1974-75.)

### GERM

522 Seminar in Baroque (3) Dunnhaupt (Offered 1974-75.)

### GERM

524 Seminar in Eighteenth-Century Literature (3) Hertling (Offered 1975-76.)

# GERM

525 Seminar in Romanticism (3) E. Behler

(Offered 1975-76.)

### GERM

526 Seminar in Nineteenth-Century Drama (3) South

(Offered 1974-75.)

### GERM

Seminar in Nineteenth-Century Prose (3) 527 Hertling (Offered 1975-76.)

### GERM

528 Seminar in Twentieth-Century Literature (3) Allard

(Offered 1974-75.)

### GERM

531 Lessing (3) A South

### GERM

Storm and Stress: Goethe, Schiller (3) A 534 Ammerlahn

### GERM

535 Classicism: Goethe, Schiller (3) W Ammerlahn

### GERM

540 Development of German Poetry From the Late Nineteenth Century to the Present (3)

McLean

Development of German poetry from Rilke, Hofmannsthal, and George through Trakl, Benn, the Expressionists and the Dadists, Brecht, and Enzenberger, to such contemporaries as Eich, Heißenbüttel, the concrete poets, Celan, and Bachmann. (Offered 1974-75.)

### GERM

### 541 Twentleth-Century German Drama (3) Rey

Selection from modern German drama representative of the concern with the human condition, of social criticism, and of experimentation with the new dramatic forms. (Offered 1974-75.)

Analysis of the important theoretical and crea-

tive writings of the Storm and Stress period

culminating in German classicism, tracing this

development in the context of the cultural and

historical setting, and showing the significance

for the future course of German history and

543 Social Criticism in Twentieth-Century

Studies of selected modern German novels and

short novels by representative authors, dealing with the social and political problems of Ger-many. (Offered 1974-75.)

### GERM

GERM

GERM

### 542 Storm and Stress and Classicism: **Revolution and Resignation (3)** Ammerlahn

civilization. (Offered 1975-76.)

German Prose (3)

544 Seminar in Goethe (3)

Ammerlahn

(Offered 1974-75.)

### GERM

550 Gothic (3) Barrack, Voyles (Offered 1975-76.)

### GERM

552 Old High German (3) Voyles (Offered 1975-76.)

### GERM

555 Old Saxon (3) Voyles

(Offered 1974-75.)

### GERM

556 Middle High German (3) W Hruby

### GERM

557 Middle High German Literature I (3) Sp **Hruby** 

### GERM

Middle High German Literature II (3) 558 Hruby

### GERM

560 Modern Dialects (3) Barrack, Voyles (Offered 1974-75.)

### 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. (Offered 1975-76.)

### GERM

#### Late Middle High German Narrative (3) 566 Hruby

Study of the evolution of the late Middle High German novelistic narrative.

### GERM

567 Late "Minnesang" (3) Hruby

Comprehensive study of the various developments of Middle High German lyric poetry from 1215 to the fifteenth century (Walther.von der Vogelweide to Oswald von Wolkenstein). (Offered 1974-75.)

### GERM

Seminar in Heroic Epic (3) 568 Hruby

Literary and historic problems of the German heroic epic, with special emphasis on the Nibe-Lungenlied and the Dietrichsepik. (Offered 1974-75.)

### 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

### 570 Nietzsche (3)

E. Behler

Intensive study of the main works of Friedrich Nietzsche in the original. Emphasis on philosophical relevance and esthetic significance. (Offered 1975-76.)

### GERM

### 572 Seminar in Heine (3)

Comprehensive study of the literary importance and the philosophical, political, and social thought of Heinrich Heine, with emphasis on his prose works.

### GERM 573 Philosophy in German Literature (3) E. Behler

Seminar devoted to the great figures of German philosophical thought and their interrelationship with German literature. Special goal is to provide future teachers of German literature with the philosophical background of their field. (Offered 1974-75.)

### GERM

574 Introduction to Methods of Teaching German (3)

Rabura

Developments in the methods of teaching German, curriculum and programs on the elementary and secondary level; qualifications of a for-eign-language teacher are discussed.

### GERM

575 Teaching Advanced German Language and Literature on Secondary Level (3) SpS South

Teaching of German language and literature on the advanced level in secondary schools and colleges. (Offered Summer Quarter 1975.)

### GERM

#### 576 Modern Methods and Materials in Teaching German (3) WS Galt. Rabura

The audiolingual method and its application; current developments in foreign-language teaching; evaluation of teaching materials. (Offered Summer Quarter 1976.)

### GERM

### 577 Principles of Second-Language Learning (3)

Galt. Rabura

Examination of the roles of aptitude, attitude, and motivation as factors affecting sec-ond-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. (Offered 1975-76.)

### GERM

### 578 Theory and Practice of Foreign Language Curriculum Development (3)

Theory and practice of developing curriculum materials (textbook chapters, learning activity packages, simple audiovisual aids, supplementary curricula) for the foreign-language classroom. The theory of test construc-tion in foreign languages also is explored. Emphasis on designing materials for use in individualized classrooms. Prerequisites, a foreign-language methods course and graduate standing. (Offered 1974-75.)

### GERM

580, 581 Seminar in the Modern Period of German Literature (1-5,1-5)

Prerequisite, permission. (Offered 1975-76.) GERM

582 The Faust Theme in German Literature (3) Sp

Ammerlahn

Seminar deals primarily with Goethe's Faust, Parts I and II. (Offered 1975-76.)

340

### GERM

590 German Mysticism of the Late Middle Ages (1-5) E. Behler

(Offered 1974-75.)

### GERM

591 German Idealism and Its Relationship to Literature (1-5) E. Behler

(Offered 1974-75.)

### GERM

592 German Existentialism and Its **Relationship to Literature (1-5)** E. Behler

(Offered 1974-75.)

### GERM

595 Seminar in Germanic Philology (1-5)

### GERM

596, 597 Seminar in German Literature (1-5,1-5)

### GERM

600 Independent Study or Research (\*) AWSp8

### GERM

700 Master's Thesis (\*) AWSpS

GERM 800 Doctoral Dissertation (\*) AWSpS

### HISTORY

### **Course for Undergraduates**

SOC S

Afro-American History (5) 150

ASD Examination of the Negro and his role in history, both in Africa and the Americas.

### **GENERAL HISTORY**

### **Courses for Undergraduates**

HST

### 111 The Ancient World (5) A

Ferrill, C. Thomas History of the origins of Western civilization to the fall of Rome.

### HST

112 The Medieval World (5) Bacharach, Mosher

113 The Modern World (5) Sp

Bridgman, Pinkney

Survey of the political, economic, social, and intellectual history of the Middle Ages. Not open to students who have taken 301.

Survey of the political, economic, social, and intellectual history of modern Europe. Not open to students who have taken 302 or 303.

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 West-

ern intellectual tradition (reason, being, na-ture, God, honor; etc.), tracing its transforma-

tion from classical times to the near present.

History of the atomic bomb from the beginning

The reading is mainly in primary sources.

215 The History of the Atomic Bomb (3)

205 Survey of Intellectual History (5) AW

### HST

HST

HST

Hankins

of nuclear physics to the security hearing of J. Robert Oppenheimer. The course includes a study of the scientific achievements that made the bomb possible, the organization of a community of scientists in the United States, the history of the Manhattan Project, the decision to deploy the bomb, the moral misgivings of the scientists involved, and the problem of espionage and security, ending with the security hearing of Oppenheimer. In addition to readings in the voluminous literature on the subject, the course includes documentary films and discussions with faculty members who were actively engaged in the research of the Manhattan Project.

### HST

### 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)

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

307 History of Christianity (5) W Treadgold

Introduction to the history of the Christian religion, including doctrine, practice, church organization, and culture, from the time of Jesus Christ to the present. No attempt to avoid the controversial aspects of the topic is made, but the necessity of founding argument on knowledge is stressed.

### HST

### 308 History of Modern Christian Theology (5) Sp

Survey of the major trends in Christian theology since the Reformation, covering the period to 1800 and concentrating on the nineteenth and twentieth centuries. Special focus given to the impact of historicism and higher criticism on liberal and conservative theology and to the efforts of Barth and Bultmann to overcome the inherited framework of liberal Protestantism.

### HST

#### 311 Science in Civilization: Antiquity to 1600 (5) A

Hankins

From preclassical antiquity to the end of the

Middle Ages, stressing the growth of scientific ideas, the cultural context in which they take shape, and their relationship to other movements of thought in the history of civilization.

### HST

### 312 Science in Civilization: Science in Modern Society (5) W

Hankins

Growth of modern science since the Renaissance, emphasizing the scientific revolution of the seventeenth century, the development of methodology, and the emergence of new fields of interest and new modes of thought.

### HST

### 345 War and Society: An Interdisciplinary Study (5) A

Bridgman Interdisciplinary study of war and society, viewing the problem from six different perspectives: historical, social, and natural scientific, humanistic, personal experience, and policy option.

### HST

### 351 History of Africa to 1800 (5) A Griffeth

History of sub-Saharan Africa from antiquity to 1800. The peopling of the continent; the Iron Age in Africa; growth of centralized political institutions; stateless societies; Islamic penetration; the African slave trade.

### HST

### 352 History of Africa Since 1800 (5) W Griffeth

History of sub-Saharan Africa from 1800 to the present. The nineteenth-century African revolutionary movements; European expan-sion 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 so-cieties 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

### 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) Sp Rutow

The confrontation between Japan and the United States from Perry to MacArthur with emphasis on the period from 1905 to 1945. Prerequisite, permission.

### HST

### 450 History of West Africa From A.D. 1000 to the Present (5) W

Griffeth

States of the Western Sudan to 1600; the trans-Atlantic slave trade; the Fulbe jihads; the coastal peoples and European penetration; colonial rule and the West African nationalist response; political independence and economic dependency in the contemporary period.

### HST

### History of East and Central Africa 451 From Antiquity to the Present (5) Sp Griffeth

Nilotic Africa and Ethiopia from the Kingdom of Axum to modern times; Bantu, Nilotic, and the Cushitic migrations and the growth of state systems; the Swahili coast, its Arab and Portuguese invaders; European conquest and the African response; modern nationalist developments to the present.

### HST

### 452 Southern Africa From 1500 to the

Present (5)

Griffeth Development of political, social, and economic institutions in Africa south of the Zambezi River from the Portuguese arrival to the present; the Cape Colony, 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

#### History of the Near East: 622-1300 (5) A 461 **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

### 465 Numismatics Seminar (3) Bacharach

Introduction to the use of numismatic evidence for political, economic, and cultural history. Prerequisite, permission.

### HST

# 469 Introduction to Modern Jewish History (5)

Selective problems in modern Jewish history, 1789-1948.

### HST

### 481 Economic History of Europe (5) Morris

Origins of the modern European economy; historical analysis of economic change and growth from medieval times that stresses the preconditions and consequences of industrialization. Offered jointly with the Department of Economics as Economics 460. Economics 200, 201 recommended.

### HST

### **491H-492H** Historical Method (5-5) W,Sp The purposes, materials, and techniques of historical scholarship. Theory, practice, and criti-

torical 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

### HST

plan to enroll.

### 499 Undergraduate Research (1-5, max: 15) AWSp

### **Courses for Graduates Only**

### HST

511 History of Science (3-6) Hankins

### HST

512-513-514 Seminar in the History of Science (3-6)-(3-6)-(3-6) A,W,Sp Hankins

### HST

524 British Empire History (3-6) Bell

### HST

543 American Diplomacy and the World Crisis, 1931-41 (3-6) A Butow

Field course in diplomacy of World War II, with emphasis on the confrontation between the United States and the Axis powers. Prerequisite, permission.

### HST

### 544-545 Seminar in American Diplomacy and the World Crisis, 1931-41 (3-6)-(3-6)

**W,Sp** Butow

Diplomacy of World War II with emphasis on the confrontation between the United States and the Axis powers. Prerequisite, permission.

### HST

551 Field Course in African History (3-6) Sp Systematic examination of key historical writings and interpretive controversies in African history, with special attention to the growth of multidisciplinary approaches to historical reconstruction and the evaluation and use of oral historical data. Prerequisites, reading knowledge of one of the following: French, German, Portuguese, Arabic, or other African language.

### HST

### 561 Islamic History (3-6)

Bacharach Field course. Introduction to advanced study in the major periods and problems of Islam. Bibliographical guidance is stressed.

### HST

### 562 Ottoman History (3-6)

Sugar

Field course. Introduction to the major periods and problems of Ottoman history, 1300-1914, by acquainting the student with the major works in at least two languages. An attempt is made to teach some use of Ottoman materials. A minor problem is investigated in detail by every student. Prerequisite, knowledge of at least one major language besides English, e.g., French, German, Russian, or other.

### HST

563 Modern Near East (3-6) Bacharach

Field course introducing the student to the major periods and problems of Near Eastern history, 1798 to the present. Prerequisite, permission.

### HST

### 571 History in the College (0)

Optional noncredit course for prospective college and university history instructors, preparing them for their duties. Prerequisite, M.A. in history.

### HST

591 Historiography: Ancient and Medieval European (3) A

### HST

592 Historiography: Early Modern European (3) W

### HST

593 Historiography: Early Modern European and American (3) Sp

### HST

594-595 Seminar in Philosophy of History (3-6)-(3-6)

### HST

### 598 Methods of Historical Research (5) Bestor

Practical instruction in the scholarly techniques employed in historical research. A professional level of competence is inculcated through written exercises involving the actual searching out of historical sources, the critical evaluation of documents, the utilization of historical evidence in writing papers and theses, and the proper forms of documentation. Field trips to various archival establishments supplements the lectures and written exercises.

### HST

### 600 Independent Study or Research (\*) AWSpS

### HST

700 Master's Thesis (\*) AWSpS

HST

800 Doctoral Dissertation (\*) AWSpS

HISTORY OF THE AMERICAS

### **Courses for Undergraduates**

### HSTAA .

201 Survey of the History of the United States (5) AWSp

Supplies the knowledge of American history that any intelligent and educated American citizen should have. The objective is to make the student aware of his heritage of the past and more intelligently conscious of the present.

### HSTAA

### 301 Foundations of American Civilization (5) A

### Johnson

Founding of Anglo-Saxon society in the western hemisphere, with attention to the earliest colonial establishments, the growth of a new culture, independence, and the organization of the American Union.

### HSTAA

### 311 American Civilization: The First Centur, 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

### 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

### 409 American Social History: The Early Years (5)

Holl

Survey of American society and institutions from the colonial era through the Civil War, with special attention to reform, labor, immigration, education, law enforcement and the city.

### HSTAA

### 410 American Social History: The Modern Era (5)

Holl

Survey of American society and institutions from Reconstruction to the present with special attention to reform, poverty, social mobility, immigrant and ethnic groups, the city and law enforcement.

### HSTAA

411 The United States During the Era of Civil War and Reconstruction (5) Sp 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

### 420 The American Disinherited (3) W Flint

Survey of major groups that have not shared in the American dream, and the clash of that dream with reality. Special emphasis is given poverty, alienation, discrimination, and other forces that produced the disinherited. The course analyzes reactions, specific periods, and issues when the disinherited became objects of local and national concern. Prerequisite, any course in the history of the United States since 1865.

### HSTAA

### 425 American Urban History Before 1870 (3) Flint, Holl

Survey of urban development in America from the seventeenth century, examining the origins of cities, bases of growth, patterns of development, and the complexities and impact of problems that resulted from the cities' internal growth pattern.

### HSTAA

### 426 American Urban History Since 1870 (3) Flint, Holl

Survey of the growth and transformation of American cities in the nineteenth and twentieth centuries, examining problems of the metropolis, the impact of industrialization and technological change, immigration, migration, ethnicity, and class; relationship between the changing physical city and the factors that gave the design its substantive form.

### HSTAA

### 429 The History of American Penology and Criminology (3)

Holl Studies in the social and intellectual history of American penology and criminology, including a study of Beccaria, Howard, 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. Not open to students who have taken 450.

### HSTAA

### 432 History of Washington and the Pacific Northwest (5)

Carstensen, Saum

Exploration and settlement; economic development; growth of government and social institutions; statehood.

### HSTAA

### 443 Black Americans, 1877-1933: From Reconstruction to the New Deal (5)

Study of Black Americans from Reconstruction to the New Deal with special emphasis on their institutional and social life, and the impact of society upon their development.

### HSTAA

### 444 Black Americans Since 1933: From the New Deal to the Present (5)

Study of Black Americans from the New Deal to the present, with special emphasis on their institutional and social life, and the impact of society upon their development.

### HSTAA :

### 451 Constitutionalism in America:

Seventeenth and Eighteenth Centuries (5)

### 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. Prerequisite, 10 credits in American history. Credit cannot be received for both 351 and 451.

### HSTAA

### 452 Constitutionalism in America: Nineteenth Century (5) W

Bestor

Study of constitutional issues in the United States from the establishment of the government under the new Constitution of 1787 until the end of the nineteenth century: basic decisions of Marshall and Taney, the slavery crisis, Reconstruction, and the constitutional enshrinement of laissez-faire. Students attend the lectures in 352 and also work with the primary historical documents in preparing papers for presentation to a discussion section, meeting for two additional hours each week. Credit cannot be received for both 352 and 452. Prerequisite, 10 credits in American history.

### HSTAA

### 453 Constitutionalism in America: Twentieth Century (5) Sp

Bestor

Study of constitutional issues in the United

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 the College of Education as EDEPS 494.

### HSTAA

History of American Education Since 459 1865 (5) Burgess

Development of American education in cultural context: progressive education, recent criticism, continuing issues and trends. Of-fered jointly with the College of Education as **EDEPS 495.** 

### HSTAA

461 Diplomatic History of the United States: 1776-1877 (5)

Fowler Foreign policy of the United States government. Emphases upon wars, territorial expansion, and the peculiarities of the American position in world politics.

### HSTAA

462 Diplomatic History of the United States: 1877-1953 (5) Fowler

Foreign policy of the United States government, from the emergence of the United States as a great power through the presidency of Harry S Truman.

### HSTAA

481 The History of Mexico: 1517 to the Present (5) W

Alden, Solberg

Political, social, and economic history of Mexico from its discovery by the Spanish to the present.

### HSTAA

482 The History of Brazil: Colonial Period to the Present (5) Alden

Colonial foundations; the first and second empires; the old and new republics; current problems; prospects for the future.

### HSTAA

### 483 The River Plate Republics and Chile: **Colonial Period to the Present (5)** Solberg

Analyzes political history, economic development, social change, and intellectual trends in Argentina, Uruguay, Paraguay, and Chile; it also considers the relations of these countries with the United States and Europe and with each other.

### HSTAA

485 Social Revolution in Twentieth-Century Latin America: A Comparative Approach (3) Solberg

Analyzes and compares twentieth-century Latin America's three major social revolutions: Mexico (1910-20), Bolivia (1952-64), and Cuba (since 1959). Lectures, discussions, and readings examine the backgrounds and causes of these revolutions, as well as the political, social, economic, and cultural changes they produced. Relationships between the United States and revolutionary and postrevolutionary governments are carefully considered.

### **Courses for Graduates Only**

### HSTAA

501 American History: Early (3-6) W Johnson

### HSTAA

503-504 Seminar in American History: Early (3-6)-(3-6) W,Sp Johnson

### HSTAA

509-510 Seminar in American Urban History (3-6)-(3-6) 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)-(3-6)-(3-6) A,W,Sp Carstensen

### HSTAA

521 American History: Writings and Interpretations, 1770-1870 (4-6) A Burke, Fowler, Pease, Pressly

### HSTAA

American History: Writings and Interpretations, Since 1870 (4-6) W 522 Burke, Fowler, Pease, Pressly

### HSTAA

**American Social History Before** 524 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)-(3-6)-(3-6) A.W.Sp Burke, Pease

### HSTAA

554 American History: Intellectual (3-6) Saum

HSTAA 555-556 Seminar: American Intellectual History (3-6)-(3-6) Saum

Develops research and writing competence in American intellectual history. Prerequisite, permission.

### HSTAA

561 History of American Foreign Policy (3-6) Fowler

HSTAA 562-563 Seminar in American Diplomatic History (3-6)-(3-6) Fowler

### HSTAA

581 Latin American History: Colonial Period (3-6) W Alden

### HSTAA

582 Latin American History: National Period (3-6) Sp

Alden, Solberg

HSTAA 583-584-585 Seminar in Latin American History (3-6)-(3-6)-(3-6) 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

Ancient History (5) Sp Ferrill, Thomas 202

Political, social, economic, and cultural develop-



ment of Rome from the beginnings in the eighth century B.C. to the beginning of the Middle Ages.

### HSTAM

### 331 Early Middle Ages (5) Mosher

The Dark Ages, feudalism, emergence of the medieval order of civilization, and the development of Romanesque culture.

### HSTAM

332 Central Middle Ages (5) Mosher

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

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

### HSTAM

civilization.

### 403 Alexander the Great and the Hellenistic Age (3)

Edmonson, Thomas

Political, social, economic, and cultural history of the Greco-Oriental world from Alexander to the Roman conquest, with special emphasis on the change from city-state to world-state and the fusion of Greek and Oriental cultures.

### 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, Mosher

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, Mosher

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, Mosher

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 re-gion within the sphere of Western European civilization.

### HSTAM

451 Medieval Italy (5) Mosher

Italy, from the barbarian invasions to the Renaissance, considered in the framework of European and Mediterranean cultures.

### 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.

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### ARTS AND SCIENCES

### 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) Mosher

### HSTAM

532, 533, 534 Medieval European Seminar (3-6,3-6,3-6) A,W,Sp

Mosher

Prerequisites, a reading knowledge of French or German and Latin.

### HISTORY OF ASIA

### **Courses for Undergraduates**

### HSTAS

HSTAS

history.

HSTAS

Conlon

Introductory

Dull

### 201 Ancient Indian Civilization (5) A Conlon

202 Modern Indian Civilization (5) W

Introductory course dealing with the religions, literature, philosophy, politics, arts, and history of India from earliest times to the Muslim invasion.

lamic impact, British conquest, and contemporary India. Emphasis on the rise of nationalism,

social organization, and contemporary life and

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 Chi-nese history. The focus is on social, cultural,

and intellectual developments.

211 History of Chinese Civilization (5) A

course dealing with the Is-

### HSTAS

### 212 History of Korean Civilization (5) Palais

Survey of Korean civilization from earliest times to the present. Course explores various aspects of the development of Korean society and culture in terms of government organization, social and economic change, literature, and art.

### HSTAS

### 213 History of Japanese Civilization (5) Pyle

Introduction to Japanese civilization from 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

#### Maharashtra in Indian History (5) 405 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 Pvle

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

#### History of Modern Japan (5) Sp 423 Pyle

Political, social, economic, and cultural devel-

opment 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)

### 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 intellec-tual history since 1895. The focus is on the processes of modernization and revolution, and on the relationship between them.

### HSTAS

### Western Influences in Russian and 476 **Chinese Intellectual History (4)** Treadgold

Comparative analysis of stages of Western impact on Russian (1462-1917) and Chinese (1582-1949) thought previous to the proclamation of Marxism-Leninism as the official ideology.

### HSTAS

### 481, 482 History of Korea (5,5) W,Sp Palais

Survey of Korean history from earliest times to the modern period. Prerequisite, permission.

### **Courses for Graduates Only**

### HSTAS

501 Indian History (3-6)

### Conlon Prerequisite, permission.

### HSTAS

### 521 Modern Japanese History (3-6) Pyle

Field course. Prerequisites, 422, 423, or permission.

### HSTAS

522 Japan as a World Power, 1895-1945 (3-6) Butow

Field course. Prerequisite, permission.

### HSTAS

#### 523. 524 Seminar in Modern Japanese History (3-6,3-6) Pvle

Prerequisite, permission.

### HSTAS

#### 525 Japan in the Twentieth Century (3-6) Beckmann

Problems in the political, economic, and social history of Japan, 1890-1952.

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### HSTAS

### 551 Field Course in Chinese History: Pre-Sung Period (3-6) Sp Dull

Introduces Western language materials on traditional China in order to give the students bibliographical and other assistance in preparing for examinations in this field of history.

### HSTAS

### 552-553-554 Seminar in Chinese History: Pre-Sung Period (3-6)-(3-6)-(3-6)

A,W,Sp Dull

Prerequisite, reading knowledge of Chinese.

### HSTAS

561 Field Course in Chinese History: Sung to Modern (3-6)

### Chan

Introduces Western language materials on Chinese history from the Sung dynasty to the modern period in order to give students bibliographical and other assistance in preparing for examinations in this field of history.

### HSTAS

### 562-563-564 Seminar in Chinese History: Sung to Modern (3-6)-(3-6)-(3-6)

### A,W,Sp Chan

Professional writing seminar in Chinese history from Sung to modern times. Prerequisite, reading knowledge of Chinese.

### HSTAS

#### **Chinese History: Modern Period** 571-572 (3-6)-(3-6) W,Sp

Field course in modern Chinese history, emphasizing extensive reading in the secondary literature on modern China. Course provides firm foundations for preparation of graduate field examinations and for future research and teaching. Readings are organized around major problems of interpretation in Chinese history since 1800. A portion of 572 is devoted to preparation of seminar papers on significant topics. Prerequisite, 454 or permission.

HSTAS

# 573-574-575 Seminar in Chinese History

Modern Period (3-6)-(3-6)-(3-6) A,W,Sp Research seminar in modern Chinese history. Training in the materials and methods of research, and preparation of extended research papers. Prerequisites, 571-572 or permission and reading knowledge of Chinese.

### HSTAS

#### 581 Modern Korean History (3-6) Sp Palais

Field course. Prerequisite, 470 or permission.

### HSTAS

### 582-583-584 Seminar in Korean History (3-6)-(3-6)-(3-6) A,W,Sp

Palais Selected topics in Korean history and historiography.

### HSTAS

### 585 Research Seminar: Modern Korea (3-6) A Palais Advanced instruction in problems and methods of research in Korean history. No foreign lan-

guage required. Prerequisite, permission.

### **MODERN EUROPEAN HISTORY**

### **Courses for Undergraduates**

### HSTEU

271, 272, 273 English Political and Social History (5,5,5) A,W,Sp

Costigan England from the earliest times to the present, stressing the origins of American institutions and social patterns.

### HSTEU

370 The Vikings (3)

Flatin

Study of the Vikings at home in Scandinavia and abroad, with particular emphasis on their activities as revealed in archaeological finds and in historical and literary sources. Offered jointly with the Department of Scandinavian Languages and Literature as Scandinavian 370.

### HSTEU

### 371 Intellectual History of Modern England (3)

Levy

Relates the changes in political theory, philosophy, science, and literature to the historical events of the period 1500 to the present.

### HSTEU

### 380 History of Scandinavia to 1521 (3) Beijbom, Hildeman

Survey of Scandinavian history from the Viking Age to 1521, with emphasis on the efforts at unification between Iceland, Denmark, Norway, and Sweden, and their relationship to the European continent. Offered jointly with the Department of Scandinavian Languages and Literature as Scandinavian 380.

### **HSTEU**

### 381 History of Scandinavia to 1809 (3) Beijbom, Hildeman

Survey of Scandinavian history from 1521 to 1809, with special emphasis on the Lutheran Reformation, the Thirty Years War, and the Napoleonic Wars. Offered jointly with the Department of Scandinavian Languages and Literature as Scandinavian 381.

### HSTEU

### 382 History of Scandinavia From 1809 to the Present (3) Sp

Beijbom, Hildeman Survey of Scandinavian history from 1809 to the present, with major emphasis on the political, social, cultural, and economic development of the Scandinavian countries. Offered jointly with the Department of Scandinavian Languages and Literature as Scandinavian 382.

### HSTEU

401 The Reformation (3)

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 modern European history.

### HSTEU

411 Europe: 1814-70 (5)

Bridgman, Emerson, Lytle, Pinkney, Sugar

Development of Europe during the age of Metternich, the revolutions of 1848, and the emergence of new national states.

### HSTEU

412 Europe: 1870-1914 (5)

Bridgman, Emerson, Sugar Impact of population increase and technological change on European society; stresses and strains in European life and outlook.

### HSTEU

413 Europe: 1914-45 (5)

Bridgman, Emerson

Politics and society of Europe in the age of the concentration camp.

### HSTEU

414 Europe Since 1945 (5)

### Ullman

Political, economic, and military developments in Europe under the impact of the Cold War.

### HSTEU

421 France, 1429-1789 (5)

Lytle, Pinkney

Political and cultural history, from Joan of Arc to the eve of the French Revolution. (Villon, Rabelais, Montaigne, Moliére, 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

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upon the continuity of the revolutionary tradition.

### **HSTEU**

430 Germany: 1000-1648 (5)

Bridgman Survey of the society, economy, and political problems of central Europe from the late Middle Ages to the Treaty of Westphalia.

### HSTEU

### 431 Germany: 1648-1914 (5)

Bridgman, Emerson Survey of the society, economy, and political problems of central Europe from the Thirty Years War to World War I, with particular emphasis on the nineteenth century.

### HSTEU

### 432 Germany: 1914-45 (5)

Bridgman, Emerson Politics and society from the collapse of the Bismarckian empire to the collapse of Hitler's empire.

### HSTEU

435 World War I (5)

Bridgman Political, institutional, cultural, and military history of World War I, with special emphasis on the impact of the war on European society.

### HSTEU

### 438 Modern Russian Intellectual History (5) Ellison, Treadgold

Development of Russian social and political thought and philosophy from the seventeenth century to the Revolution of 1917.

### HSTEU

### 441 Medieval Russian Chronicles (5) A Waugh

Introduction to the history of Russian chronicle writing, and to the study of the chronicles as literature and as historical sources, with emphasis on the latter. Prerequisites, reading knowledge of Russian and permission; 443 recommended. (Offered alternate years; offered 1974-75.)

### HSTEU

### 442 Russian Culture to the Era of Peter the Great (5)

Waugh

Emphasis on the development of Kievan and Muscovite "high" culture (to the beginning of the eighteenth century): religion, political ideas, the arts in a broad sense; questions of cultural influences. Extensive use of audiovisual materials. Prerequisite, 443 or permission. (Offered alternate years; offered 1975-76.)

### **HSTEU**

443 Kievan and Muscovite Russia: 850-1700 (5) A

Waugh

Development of Russia from earliest times to the reign of Peter the Great. Prerequisites, HST 111 and 112, or permission.

### HSTEU

444 Imperial Russia: 1700-1900 (5) W Treadgold, Waugh

Development of Russia from Peter the Great to Nicholas II. Prerequisites, 443 or HST 111 and 112, or permission.

Russia and the USSR from Nicholas II to the

present. Prerequisites, 444 or HST 111, 112,

### **HSTEU**

and 113, or permission.

### 445 Twentieth-Century Russia (5) Sp Ellison, Treadgold

### 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 Roha

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 acquiring national identity and political consciousness. Emphasis on processes of assimilation and alienation.

### HSTEU

451 Eastern Europe: 1772-1918 (5) A Sugar

Poland, Czechoslovakia, Hungary, Rumania, Yugoslavia, Bulgaria, and Albania, from the first partition of Poland to the end of World War İ.

### 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) Ūllman

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

The Jews in Spanish History (3 or 5) 464 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 Roll

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 Twentleth Century (5) Bell, Costigan

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) Costigan

Growth of Irish national feeling in the nineteenth century through the home rule and Sinn Fein movements; establishment of the Irish Free State and the Republic of Eire; background of the Irish literary renaissance; establishment of Northern Ireland.

### **Courses for Graduates Only**

### HSTEU

501 Renaissance and Reformation (3-6) Griffiths

HSTEU

502-503-504 Seminar in the Renaissance and Reformation (3-6)-(3-6)-(3-6) A,W,Sp Griffiths

### HSTEU

515 Modern European Intellectual History (3-6) A Kilcup

Readings and discussions on selected problems in eighteenth- and nineteenth-century intellectual history. Prerequisites, reading knowledge of French and permission.

### HSTEU

516-517 Seminar: European Intellectual History (3-6)-(3-6) A,W Kilcup

Seminar on modern European intellectual history, chiefly in the eighteenth century. Prerequisites, permission and a reading knowledge of French, Italian, or German.

### HSTEU

521 Modern European History: France (3-6) Lytle, Pinkney

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### 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 1974-75.)

### 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) Sp

Waugh

Prerequisite, reading knowledge of Russian. (Offered alternate years; offered 1975-76.)

### HSTEU

Modern Russian History (3-6) A 544 Treadgold

### HSTEU

545-546-547 Seminar in Modern Russian History (3-6)-(3-6)-(3-6) A,W,Sp Ellison, Treadgold

Seminar in modern Russian history. Prerequisite, reading knowledge of Russian.

### HSTEU

### 548 Field Course in Soviet History (3-6) Sp 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)

Sugar

Prerequisite, reading knowledge of one major European or one East European language.

Study and research involving special methods

dealing with the histories of the East European

### HSTEU

553-554-555 Seminar in Modern East European History (3-6)-(3-6)-(3-6)

countries in the modern period.

### A,W,Sp Sugar

### 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) Levv

### HSTEU

572 English History (3-6) Bell, Costigan

### HSTEU

### 573-574 Seminar in Modern English History (3-6)-(3-6) Bell, Costigan

### 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**

### H EC

### 110 Food and Nutrition (5)

Meal management and food preparation with emphasis on nutritive and economic values. For nonmajors. Not open to students who have had 300.

### H EC 125 Textiles (3) King

Relationship of raw materials, their properties, structural characteristics, and finishes utilized in textile production to quality and cost. Consideration of production and mar-keting practices. Textile legislation affecting consumer needs and choices.

### H EC

### Clothing (5) Murdoch, Shigaya 134

Economic and esthetic aspects of clothing selection and construction.

### H EC

#### The Home, Its Equipment, and 148

Management (3) Wilson

Management of resources to achieve family goals. Principles of management, kitchen and laundry planning, work simplification, wiring, and selection and care of household equipment.

### H EC Textile Analysis (2) 225 King

Emphasis on physical characteristics and properties of textile fibers; relationships to performance, selection, and care; use of test equipment and evaluation of data with reference to consumer use. Prerequisite, 125, which may be taken concurrently.

### H EC

### 231 Clothing Selection (2) Sociological, psychological, economic, and esthetic aspects of clothing for the individual. Not open to students who have had 134.

### H EC

#### Costume Design (5) 234 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.

### H EC

### 240 Home Furnishing (3) Schroeder

Study of the house and its furnishings for present-day living. Not open to freshmen or to students who have taken 347.

### H EC

300 Nutrition (2) Importance of food to the maintenance of health; nutritive values and human needs; ways of meeting requirements. For upper-division nonmajors. Not open to students who have taken 110.

### H EC

### 307 Nutrition (5)

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 or-ganic chemistry and human physiology.

### H EC

### 314 Foods I (5) Martinsen

Composition, structure, and interactions of the constituents of foods, with emphasis on the principles underlying the preparation of foods of standard quality. Prerequisite, organic chemistry.

### H EC

#### 316 Demonstration Techniques (3) Martinsen

Principles and techniques of food and equipment demonstrations; food photography; recipe development. Prerequisite, 314 or permission.

### H EC

#### 317 Foods II (3)

Martinsen

Study of new food products, food additives, and convenience food items. Some time is spent on origins of food patterns of various cultures, food buymanship, and characteristics of certain wines and spirits. Prerequisite, 314.

### H EC

#### Nutrition and Nursing (4) A 319 Monsen, Worthington

Basic principles of nutrition and their relationship to the nursing profession. Chemistry and metabolism of the nutrients essential for the maintenance of health; normal nutrition needs of individuals at various age levels; environmental influences on nutrition; assessment of nutritional status; nutritional values of foods; dietary modifications as appropriate in the nutritional component of medical treatment. Prerequisites, Conjoint 317-318, and organic chemistry.

### H EC

### 320 Nutrition and Dental Health (4) WSp Monsen, Worthington

Chemistry and metabolism of essential nu-trients 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 pa-tients. Prerequisites, Conjoint 317-318, and organic chemistry, or permission.

### H EC

321 Applied Design (2) Functional and decorative phases in the development of needlework and their application to contemporary design and textile art. Illustrated by a unique collection of historic lace. Prerequisites, 134 and ART 109 or 129 or equivalent, or nermission

### H EC

**322** Applied Design (2) History of European national costume and embroidery as source material for modern design. Illustrated by rich collection of authentic folk costumes. Prerequisites, 134 and ART 109 or 129 or equivalent, or permission.

### H EC

### Weaving: Basic Structural Design (3) 329 Brockway, Wilson

Weaving as an art form; fundamentals of loom design and operation; experimental problems in basic fabric structure. Prerequisites, permission and junior standing.

### H EC

### 334 Costume Design (3)

Katz

Designing as interpreted by techniques of draping, appropriate for silk and synthetic fabrics. Study of economic factors involved in clothing production at various price levels. Prerequisite, 234

### **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 socioeconomic environmental factors and to differing age groups. Prerequisite, 134.

### H EC

### 347 Home Furnishing (5) Schroeder

Analysis of problems of shelter and furnishing with relation to today's family living. Field trips and individual laboratory problems. Prerequisites, 125 and ART 109 or 129, and upper-division standing.

### H EC

### 348 Home Management (3) Wilson

Principles of management, with emphasis on decision making and resource allocation in the home and the community; experimental problems in time and energy expenditure; home care and maintenance; meal management and other related areas. Prerequisites, 148, 307, 314, 347, and 354.

### H EC

### 350 Managing Family Finances (3) 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, Economics 200 and junior standing.

### HEC

### 356 Family Relationships (3) Stone

Principles underlying good family relation-ships; adjustment of the family in a changing society. Prerequisite, upper-division standing.

### HEC

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

#### Field Work in Apparel Manufacturing 380 (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, Martinsen

Qualitative and quantitative methods of analysis appropriate to the evaluation of foods and to the study of animal and human nutrition. Application of these methods. Prerequisites, 307, 314, inorganic and organic chemistry.

### H EC

406 Recent Developments in Nutrition (3) Review of nutrition in the light of recent developments; interpretation of current research; special needs of various age groups.

### H EC

### 407 Advanced Nutrition (3)

In-depth consideration of metabolic pathways, with emphasis on participation of major nutrients. Consideration of recent research in nutrition and methods of utilizing knowledge in public health work, teaching, and research. Prerequisites, 307 and organic chemistry, or permission.

### H EC

### 408 Diet Therapy (3) Sp

Nutrition as a factor in etiology and treatment of disease. Journal readings. Prerequisite, 407.

### H EC

#### 409 Food and People (3) A

Monsen

Economic, cultural, and social determinants of food patterns. Problems of population and food supply. Meaning of food to different peoples. An ecological approach to malnutrition as a major world problem. Programs of national and international scope designed to combat malnu-trition. Prerequisites, 307 or 15 credits of social science and upper-division standing.

### H EC

### 410-411 Clinical Diet Therapy (3-3) A,W Monsen

Nutrition as a factor in the etiology and treatment of disease and the maintenance of health. Students enrolled in the clinical dietetic program actively participate in the development and implementation of nutritional care plans for individuals with selected medical and surgical conditions. This is implemented by concurrently taking 490. Prerequisites, senior standing in clinical dietetics or 407, and Biochemistry 405, or permission.

### H EC

415 Experimental Foods (3) W

Illustrating scientific principles by subjective and objective testing of foods. Individual research problems. Prerequisite, 314 or permission.

### H EC

### 425 Advanced Textiles (3) Brockway

Textiles testing as a tool in measuring fabric performance; methods of quality control; textile legislation and standards. Economic factors affecting worldwide production and distribution of textile products. Consumers as a force affecting research and textile technology. Prerequisites, 125, 225, organic chemistry, and Economics 200 or equivalent.

### H EC

### Advanced Weaving (3) 429 Brockway

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) Yerina

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) Yerina

Continuation of 432 from the Renaissance to the present. Prerequisite, 432.

### H EC

### 434 Costume Design (3)

Shigaya

Principles of designing and tailoring outer garments. Analysis of methods and comparative costs of custom and ready-to-wear gar-ments. Prerequisites, 234, 338 or 334, and permission.

### H EC

### 435 Advanced Costume Design (5) A Shigaya

Application of the principles of drafting, gradmodel and the pattern designing for men and women. Developing a special line for mass production. Compilation of a portfolio. Pre-requisites, 234, 334, 434 and ART 105, 106, and 109.

### H EC

### 437 Socio-Psychological Aspects of Clothing (3) Yerina

Clothing as a reflection of culture and societal

value concepts. Emphasis on theory, motivation, behavioral patterns. Prerequisites, 432, 433, or equivalent from other disciplines; 10 credits from sociology or anthropology or psychology, including Psychology 345.

### H EC

### 438 Cultural Aspects of Clothing (3)

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) Yerina

Chronological development of design in Western textiles. Includes study of motifs, production techniques and materials, and sociocultural influences on development and changes in design. Prerequisites, 125, ART H 201, 202, 203, or permission.

### H EC

### 444 Clothing for the Handicapped (3) Sp Murdoch

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 gar-ments; examination of recent research in the field; and a review of selected professional organizations and community agencies concerned with the handicapped. Prerequisites, upper-division standing and permission.

### H EC

### 447 Advanced Home Furnishing (3) Schroeder

Individual projects in specific fields of furnishings. Laboratory problems. Prerequisites, per-mission, 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 Economics 200.

### H EC

### 456 Advanced Family Relationships (3) Stone

Advanced study of family relationships, with special emphasis on the family and its members as part of the community and on community resources serving the family. Application of concepts from the behavioral sciences to the family. Prerequisites, 356 or teaching experience, and upper-division standing.

### H EC

457 Child Nutrition and Care (3) Role of nutrition in human growth and development, with emphasis on prenatal, neonatal, preschool, and school-age periods. Food habits and physical, mental, and emo-tional health of children. Experience with parents and children in a nutrition clinic under supervision of a pediatrician. Prerequisite, 300 or 307, or permission.

### H EC

### 462 Improvement of Teaching: Home Economics (3, max. 6)

Identification of goals, concepts, and generalizations in home economics units at the secondary level with emphasis on teaching techniques, evaluation, and use of resources. Prerequisite, teaching experience in home economics or permission.

### H EC

### 472 Quantity Food Service Purchasing (3)

Market organization, buying procedures, payment and credit; food selection and care; inspection of merchandise. Prerequisites, 314 and 372.

### H EC

### 473 Quantity Food Service Organization and Management (5) Sp

Organization and administration in food service institutions. A study of types of institutions, work planning, personnel direction, quality and cost controls, sanitation, budget analysis, professional ethics, executive qualifications. Prerequisite, 372.

### H EC

### 475 Quantity Food Service Equipment (3)

Equipment requirements and flow of work in institutions. Institution kitchens and serving units; equipment selection, operation, and care; repair and depreciation records. Prerequisite, 372.

### H EC

 480 Special Problems in Family Economics (\*. No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp

Individual study and research in family economics. Prerequisite, permission.

### H EC

481 Special Problems in Institution Administration (\*. No more than 10 credits in the 480

series may be applied toward any one degree.) AWSp

Individual study and research in institution administration. Prerequisite, permission.

### H EC

482 Special Problems in Home Economics Education

(\*. No more than 10 credits in the 480 series may be applied toward any one

degree.) AWSp

Individual study and research in home economics education. Prerequisite, permission.

### H EC

 483 Special Problems in Family Relationships (\*. No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp

Individual study and research in family relationships. Prerequisite, permission.

### H EC

 484 Special Problems in Costume Design (\*. No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp

Individual study and research in costume design. Prerequisite, permission.

### H EC

- 485 Special Problems in Textiles
- (\*. No more than 10 credits in the 480 series may be applied toward any one degree.) AWSD

degree.) AWSp Individual study and research in textiles. Prerequisite, permission.

### H EC

486 Special Problems in Foods

 (\*. No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp

Individual study and research in foods. Prerequisite, permission.

### H EC

487 Special Problems in Home Furnishing (\*. No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp

Individual study and research in home furnishing. Prerequisite, permission.

### H EC

488 Special Problems in Home Management (\*. No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp

Individual study and research in home management. Prerequisite, permission.

### H EC

489 Special Problems in Nutrition (\*. No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp

Individual study and research in nutrition. Prerequisite, permission.

### H EC

490 Clinical Dietetic Experience (1-2, max. 10) AWSp Buergel, Fontana

Opportunity for the student in clinical dietetics to participate in the delivery of nutritional care to individuals and groups in a variety of health-care facilities under the supervision of a clinical instructor. Taken concurrently with 407, 410-411, 457, and EDC&I 328. A minimum of three hours each week for ten weeks by arrangement. Prerequisite, enrollment in the clinical dietetic program.

### H EC

### 491 Clerkship in Clinical Dietetics (4) WSp Buergel, Fontana

Opportunity for senior students in clinical dietetics to participate in the delivery of nutritional care to individuals and groups and to develop increased professional competency. The faculty, clinical instructors, and students select appropriate clinical experiences in a community health-care facility. Sixteen hours of supervised clinical experience each week for ten weeks by arrangement. Prerequisites, senior standing in the clinical dietetic program and completion of sequential course work.

### H EC

492 Advanced Clerkship in Clinical Dietetics (10) Sp8 Buergel, Fontana

Opportunity for the senior student in clinical dietetics to apply and extend clinical skills. Under the direction of a clinical instructor, the student is responsible for planning, directing, implementing, and evaluating the delivery of nutritional care to individuals, and/or groups in a community care facility. The clinical facilities are selected to meet the intererests of the individual student. Forty hours of supervised clinical experience each week for ten weeks. Prerequisites, senior standing in the clinical dietetic program and completion of 491.

### H EC

### 494 Workshop in Home Economics Education (2½) S

Current problems in home economics educa-

tion. Prerequisites, EDC&I 327 and EDUC 375, or equivalent.

### H EC

# 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**

### H EC

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.

### H EC

### 506 Clinical Nutrition in Normal and

Handicapping Conditions of Children (6) In an interdisciplinary clinical setting application of principles of advanced nutritional needs of normal infants, children, adolescents, and pregnant women and the nutrition and feeding problems of mentally retarded and multihandicapped children. Participation in clinics conducted by interdisciplinary teams, in 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.

### H EC

### 507 Seminar in Nutrition (1-3, max. 9)

Library research and seminar on selected topics in recent developments in the field of nutrition. Prerequisite, 407 or equivalent.

### H EC

### 509 Evaluation of Nutritional Status (3) Monsen

Dietary, clinical, and biochemical-biophysical components in the assessment of nutritional status. Interrelationships of nutrients and effects of varying levels of nutrient intake. Critical appraisal of nutritional status surveys. Experimental design and dietary methodology. Prerequisites, 407, 408, Biochemistry 405, or equivalent.

### H EC

### 510 Community Nutrition (3)

Survey of major nutritional problems facing American communities, with special emphasis on the problems of pregnancy and childhood. Practical approaches to nutrition education and the dynamics of changing food habits. Program planning and exposure to available resources for interdisciplinary services. Current programs in the United States and other countries. Prerequisites, 457 or equivalent, 509, or permission.

### H EC

### 511 Field Work in Public Health Nutrition (2-12, max. 12)

Observation and participation in community agency nutrition programs. Prerequisite, permission.

### H EC

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.

### H EC

525 Seminar in Textiles (3) Sp Brockway

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,

### H EC

537 Seminar: Clothing (3, max. 6) Yerina

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.

### H EC

### 554 Social and Economic Problems of the Consumer (3-5)

Hall

Selected topics in the family economics field. Prerequisites, 454 or equivalent, and permission.

### H EC

### 556 Seminar in Family Relationships (3) Stone

Seminar on recent developments in the field of family relationships, with emphasis on current research methods and findings. Prerequisites, 456 or equivalent, and permission.

### H EC

**562** Home Economics Education (\*) Study of achievements, trends, functions, methods, and teaching materials.

### H EC

600 Independent Study or Research (\*) AWSp

### H EC

700 Master's Thesis (\*) AWSp

### HUMANITIES

### 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.

### LINGUISTICS

For courses in English for foreign students, see English 150, 151, 160, 303, 304, 305, and Speech 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 Banfield, Newmeyer, Saporta, Selinker

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; not offered 1974-75.)

### LING

### 333 Linguistics and Society (3) A Newmeyer

Interaction of language, culture, and society, and the relationship of linguistic theory to societal problems. Ethical and political considerations involved in the application of linguistic theory also are discussed.

### LING

400 Survey of Lingüístic Method and Theory · (3) AWSpS

Banfield, 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, Pope

Designed to provide students in linguistics (and other fields) with an exposure to some of the major approaches to the study of language.

### LING

404, 405, 406 Indic and Indo-European (3,3,3) Voyles

Reading of simple Sanskrit texts with emphasis on structure of Sanskrit and its comparison with other Indo-European languages. Introduction to principles of comparative linguistics.

### 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 psycholinguistic nature of reading; structure of orthographic systems; reading and developmental psycholinguistics; linguistic models of reading pedagogy. Prerequisite, course in reading or linguistics.

### LING

441 Linguistics and Poetic Language (3) W Banfield

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 Small

A study of some of the connections between recent linguistics and philosophy, primarily philosophical problems that arise in the attempt to understand current linguistic theories and the implications of linguistics for philosophy. Offered jointly with the Department of Philosophy as Philosophy 443. Prerequisite, permission.

### LING

### 445 Teaching English as a Foreign Language (3) W Selinker

Linguistic analysis as a basis for the teaching of English as a foreign language; language as rule-governed behavior. Prerequisite, 400.

### LING

# 447 Language Development (3) A Dale

The study of first-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Offered jointly with the Department of Psychology as Psychology 457. Prerequisite, senior or graduate major standing.

### LING

### 449 Second-Language Learning (3) Sp Selinker

Survey of issues related to second language learning: learning to read in a second language, learning the linguistic aspect, and learning the subject matter. Prerequisite, 200 or 400.

### LING

### 451, 452, 453 Phonology (3,3,3) A,W,Sp Brame

Detailed study of speech sounds, mechanisms of their production, and structuring of sounds in languages; practical experience with a wide variety of languages; field techniques. Offered jointly with the Department of Anthropology as ANTH 451, 452, 453. Prerequisite, 200 or 400, which may be taken concurrently, or permission.

### 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 the Department of Anthropology as ANTH 455.

### LING

### 461, 462, 463 Syntax (3,3,3) W,Sp,A Newmeyer

Study of the structuring of meaningful elements in language; generative views of grammar. Offered jointly with the Department of Anthropology as ANTH 461, 462, 463. Prerequisite, 200 or 400, which may be taken concurrently, or permission.

### LING

### 464 Phonetic Transcription (21/2) S

Practice in the transcription and analysis of phonological data from non-Indo-European languages. Prerequisite, permission. (Offered Summer Quarter only.)

### 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 (5) S** Training in practical solutions to grammatical problems from a variety of languages. Prerequisite, permission.

# M

### LING

467 Grammatical Exercises (21/2) S Practice in eliciting, recording, and analyzing grammatical data of a non-Indo-European language. Prerequisite, 466, which may be taken concurrently. (Offered Summer Quarter only.)

### LING

471 Survey of Linguistic Theories (5) S

### LING

472 Linguistic Analysis (5) S

### LING

473 Informant Techniques (5) S Guided practice in analyzing the phonology

and grammar of a non-Indo-European language. Prerequisites, 471 and 472, which may be taken concurrently.

### LING

### 478 Introduction to Southeast Asian Linguistics (3) Sp 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; offered 1974-75.)

### 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

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) Sp

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 blems in phonologi

Problems in phonological theory, generative phonology, phonological change. History of phonological analysis. Prerequisites, 451, 452, 453. (551, 552 not offered 1974-75.)

### LING

553 Analysis of Linguistic Structures (3, max.6) Sp

Banfield

Syntactic and/or phonological analysis. Language varies. Offered jointly with the Department of Anthropology as ANTH 553. Prereqquisite, 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. (563 not offered 1974-75.)

### LING

565 Contrastive Linguistics (3) Sp

Selinker

The attempt to look across linguistic systems for comparable and contrastive classes and subclasses. Problems of subcategorization and universal grammar. Three conceptually distinct models: structural, transfer grammar, generative. Prerequisites, 452, 463.

### LING

### 578 Seminar in Southeast Asian Linguistics (3, max. 9) Sp

Cooke

Advanced consideration of specialized problems in Southeast Asian linguistics. Reports on individual research. (Offered alternate years; offered 1975-76.)

### LING

579 Comparative Altaic Linguistics (3) W Comparative phonology and morphology of Mongol and Turkic and other related languages. Offered jointly with the Department of Asian Languages and Literature as Mongolian

### LING

580 Problems in Linguistics (3, max. 12)

### AWSp

579. Prerequisite, permission.

Banfield, Shapiro 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. For Educational Opportunity Program students. Assumes no previous experience in algebra. (Not open to regularly admissible students who have completed two years of college-preparatory mathematics with C or better grades.)

### MATH

### 101 Intermediate Algebra (0) AWSp

Similar to third semester of high school algebra. Available only through Evening and Extension Credit Programs upon payment of a separate fee. Prerequisite, one year of high school algebra and prerequisite to 104, 105, 114.

### MATH

### 104 Plane Trigonometry (0) AWSp

Trigonometric functions, identities, equations, inverse functions, graphs, logarithms, and solution of triangles. Available only through Evening and Extension Credit Programs upon payment of a separate fee. Prerequisites, 101 or equivalent and one year of plane geometry.

### MATH

### 105 Elementary Functions (5) 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, probability, and elements of matrix algebra. Intended primarily for students in the biological and social sciences and in business administration. Credit may not apply toward a major in mathematics. Prerequisite, one and one-half years of. high school algebra, or 101 or equivalent.

### MATH

### 114 Elementary Computer Programming (3) 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 equivalent; 101 and 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 among 124, 134H, and 157 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 among 124, 134H, and 157 may be counted toward any degree. Prerequisites, four years of high school mathematics including one year of calculus, and permission.

### MATH

### 157 Elements of Calculus (4) AWSp

Elementary treatment of the differential and integral calculus of simple functions. Intended for students who wish only a brief course in calculus. Prerequisite, one and one-half years of high school algebra or 101 or equivalent.

### MATH

170, 171 Theory of Arithmetic (3,3)

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, one year of geometry, and either third-semester high school algebra or Philosophy 120 or equivalent 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. Not recommended for mathematics majors. Prerequisite, 124 or 157.

### MATH

224 Intermediate Analysis (3) AWSp Rigorous treatment of the foundations of single-variable calculus. Limits, continuity, the completeness property of the real numbers and some of its consequences, theorems on differentiation and Riemann integration. Infinite series. Prerequisite, 126 or 136H.

### MATH

### 234H, 235H, 236H Advanced Calculus (3,3,3) A,W,Sp

Honors courses covering the material of 238, 324, 325, 326, and selected other topics. Prerequisites, 136H or permission for 234H; 234H for 235H; 235H for 236H.

### MATH

### 238 Elements of Differential Equations (3) 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) WSD

Formal principles of inference and definition. Propositional inference and inference involving quantifiers. Applications to elementary mathematical theories and to the axiomatic method are stressed. Prerequisites, 126, or 105 and Philosophy 120.

### MATH

# 324, 325, 326 Advanced Calculus I, II, III (3,3,3) 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, 224 and 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. Not recommended for mathematics majors. Prerequisite, 126 or 136H. Not open for credit to students who have taken 324.

### MATH

### 328 Advanced Calculus (3) AWSp

Implicit function theorem, Lagrange multi-pliers, surfaces and surface integrals, vector analysis in three dimensions, theorems of Gauss and Stokes. Not recommended for mathematics majors. Prerequisite, 327 or 324. Not open for credit to students who have taken 325.

### MATH

### 374 Principles of Digital Computers and Coding (3) AWSp

High-speed digital computation, number systems, machine components, programming, operation. Prerequisites, 114 and 125 or 134H.

### MATH

### 400 Elementary Set Theory (3) Sp

Basic axioms of set theory, algebra of sets, Peano axioms, axiom of choice and Zorn's Lemma, transfinite recursion, cardinal numbers and arithmetic. Prerequisite, 236H or 325, or permission.

### MATH

### 402, 403, 404 Introduction to Modern Algebra (3,3,3) A,W,Sp

Algebraic systems; elementary theory of groups, rings, and fields; polynomials; topics in theory of 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

### Mathematical Optimization Theory 407, 408 (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. Restricted to teaching majors, and not open for credit to students who have taken 402, 403. Prerequisites, 205 or 302 for 411: 411 for 412.

### MATH

### 420 History of Mathematics (3) W

Survey of the development of mathematics from its earliest beginnings through the first half of the twentieth century. Prerequisites, 224, and 403 or 412.

### MATH

### 424, 425, 426 Fundamental Concepts of Analysis (3,3,3) A,W,Sp

Sets, real numbers, topology of metric spaces, normed linear spaces, 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

Orthogonal functions and boundary value problems, calculus of variations. Prerequisites, 234H or 324 or 327, and 238.

### MATH

### 438 Principles of Differential Equations (3) AWSD

Linear systems, existence of solutions, solution by series, special functions. Prerequisite, 236H or 224; 238 and 302 recommended.

### MATH

### 441, 442, 443 Advanced Geometry (3,3,3) A,W,Sp

Selected topics from among: projective geometry, differential geometry, advanced analytic geometry, algebraic geometry, algebraic topology, and the geometry of convex bodies. Pre-requisites, 324 or 327, 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 374.

### MATH

465 Numerical Analysis II (3) W Numerical methods in algebra. Systems of linear equations, matrix inversion, successive approximations, iterative and methods. Prerequisites, 303 and 464. relaxation

### 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 the College of Education as 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. Chisquare tests. Linear regression theory. For nonmajors only. No more than 6 credits from among 281, 391, 392, Quantitative Science 281, and Psychology 302 may be counted toward any mathematics degree. Prerequisite, 105.

### MATH

### 391 Elementary Probability (3) AWSp

Sample space, random variables, laws of probability. Combinational probabilities. Distributions: binomial, normal; expectation, variance. No more than 6 credits from among 281, 391, 392, Quantitative Science 281, and Psychology 302 may be counted toward any mathematics degree. Not intended for nonteaching majors in mathematics or the physical sciences or those desiring more than one quarter of probability. Not open for credit to students who have taken 394. Prerequisite, 327 or 234H.

### 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, Quantitative Science 281, and Psychology 302 may be counted toward any mathematics degree. Not intended for nonteaching majors in mathematics or the physical sciences. Prerequisite, 391.

### MATH

### 394 Probability (3) AW

Sample spaces; basic axioms of probability; combinatorial probability; conditional proba-bility and independence; binomial, Poisson and normal distributions. Prerequisite, 224 or 136H.

### MATH

### 395 Probability (3) WSp

Random variables; expectation and variance; laws of large numbers; normal approximation and other limit theorems; multidimensional distributions and transformations. Prerequisite, 394

### MATH

### 396 Probability (3) Sp

Characteristic functions and generating functions; recurrent events and renewal theory; random walk. Prerequisite, 395.

### MATH

482. 483 Statistical Inference (3,3) AW,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, queuing 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. Prerequisite, 404 or equivalent for 504; 504 for 505; 505 for 506.

### MATH

### 507, 508 Foundations of Mathematics (3,3) 8.5

Fundamental concepts and methods of mathematics; the axiomatic method; the logical foundations of mathematics. Prerequisite, 507 for 508.

### MATH

510 Seminar in Algebra (\*, max. 5) 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

### ARTS AND SCIENCES

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, Lebesque integration and limit theorems, Fubini theorem, Lpspaces,  $L_2$  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 representa-tion. 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) AW,WS,Sp

Complex numbers; analytic functions; contour integration; power series; analytic continua-tion; sequences of analytic functions; conformal mapping of simply connected regions. Prerequi-sites, 426 for 534; 534 for 535; 535 for 536.

### MATH

537 Applications of Operator Theory (3) A Schrodinger 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 1973-74.)

### 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 Rn, inverse func-tion 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 Lp 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 knowl-edge 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

Properties of diffusion, wave, and Laplace-type equations. Initial and boundary value problems. Series expansions, transform methods. Singu-larities, Green's functions. Classification of second-order equations; theory and applications of method of characteristics. Numerical techniques. Offered jointly with the Department of Aeronautics and Astronautics as Aeronautics and Astronautics 569. Prerequisite, 428 or Aeronautics and Astronautics 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 1974-75.)

### MATH

585 Numerical Mathematics (3) Numerical solution of linear algebraic systems, algebraic eigenvalue problems, ordinary and partial differential equations. Offered jointly with the Computer Science Group as Computer Science 585. Prerequisites, 303, 438, and programming with a procedure-oriented language.

### MATH

586 Numerical Mathematics (3) Continuation of 585. Selected topics in numerical mathematics. Offered jointly with the Computer Science Group as Computer Science 586. Prerequisite, 585 or permission.

### MATH

600 Independent Study or Research (\*) 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, Sto-chastic 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

### MUSIC

### **Courses for Undergraduates**

Courses primarily for nonmajors (see also Ensembles).

### MUSIC

University Singers (1, max. 12) AWSp 100 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.

### MUSIC

The Orchestra (2) AWSp 121 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

Symphonic Music: Contemporary (2) Sp 124 Sokol

### MUSIC

The Concerto (2) A Sokol 128

### 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, perfor-mance on variety of musical instruments, use of musical notation, development of analytical and score-writing techniques, development of aural perception ability. Prerequisite, permission. (Last time offered: Spring Quarter 1975.)

### MUSIC

### 185 The Concert Season (4) W 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

Music of Greater Mexico (3) 300 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

Afro-American Music (5) 319 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

329 Chamber Music (2) W McInnes

Survey of literature for ensembles.

### MUSIC

330 Music in the United States (2) W Clarke

Contribution of music to the development of American culture.

### MUSIC

331 History of Jazz (3) AWSp

Brazil, 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

Music in Theatre (3) 385

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

Piano Ensemble (1, max. 12) AWSp 104 Geissmar

### MUSIC

Brass Ensemble (1, max. 12) WSp 105 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

Fundamentals of Electronic Music (2) 108 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

Composition (2, max. 6) AWSp 191 Beale, Benshoof, Bergsma, Dorsey, Kechley, Smith, Tufts

One half-hour private lesson and a one-hour laboratory session each week. Intended to develop skill in creative musical expression.

### MUSIC

Wind Sinfonietta (1, max. 12) AWSp 201 Welke

### MUSIC

202 Jazz Improvisation (1, max. 6) WSp Smith

Improvisational techniques in the jazz style for instrumentalists, with priority given to woodwind performers.

357

### MUSIC

203 Marching Band (1, max. 5) A Bissell

### MUSIC

204 Percussion Ensemble (1, max. 12) AWSp Shrader

ARTS AND SCIENCES

### MUSIC

205 Non-Western Ensemble (1, max. 12) AWSp Garfias

### MUSIC

206 Jazz Ensemble (1, max. 12) AWSp Brazil

### 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

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, 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

Benshoof

A,W,Sp

A,W,Sp Jussila

A,W,Sp Welke

A,W,Sp Bissell

Shrader

Violin, viola, cello, string bass.

Jussila

requisite, 112.

To be taken concurrently with 210, 211, 212.

MUSIC

MUSIC

MUSIC

MUSIC

MUSIC

232

MUSIC 216, 217, 218 Introductory Composition (2,2,2) A,W,Sp

220, 221, 222 String Techniques I (1,1,1)

223, 224, 225 String Techniques II (1,1,1)

226, 227, 228 Woodwind Techniques (1,1,1)

226: clarinet. 227: flute. 228: double reeds.

229, 230, 231 Brass Techniques (1,1,1)

229: trumpet. 230, 231: lower brass.

Percussion Techniques (1) A

For students not majoring in composition. Pre-

### 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, Smith, Tufts

One half-hour private lesson and a one-hour laboratory session per week. Prerequisite, 191.

### MUSIC

### Advanced Music Theatre Technique (1) W 309

Rosinbum

Dramatic interpretation of musical style as represented by the major opera composers since Mozart. Prerequisite, 233.

### MUSIC

310 Modal Counterpoint (3) A Babb

Sixteenth-century style. To be taken concurrently with 313. Prerequisites, 212 and 215.

### MUSIC

Tonal Counterpoint (2) W 311 **Benshoff** 

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, Terry 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 (1,1,1) A,W,Sp Eichinger, Hokanson, Kind For applied music majors.

### MUSIC

334 Band Arranging (2) W Welke 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

**Keyboard Performance Practices (2)** 338 AŴSp 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 Eichenberger, Krachmalnick, Sokol, Welke Prerequisite, 280.

### MUSIC

391 Composition (2, max. 6) AWSp Beale, Benshoof, Bergsma, Dorsey, Kechley, Smith, Tufts

One half-hour private lesson and a 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. (Not offered 1974-75.)

### MUSIC

Early Renaissance Music: 1400-1525 (3) 401 W Harman

Dunstable through Josquin. (Not offered 1974-75.

### MUSIC

### 402 Late Renaissance Secular Music: 1525-1630 (3) A

Harman The madrigal in Italy, England, and Germany. The Chanson, Jannequin through Lassus. (Not offered 1975-76.)

### MUSIC

403 Late Renaissance Sacred and Instrumental Music: 1525-1630 (3) W Harman

Latin church music, Willaert through G. Gab-

358

rieli; early Reformation church Walther through Gibbons; instrumental music, Cabezon, the English virginal school, and Sweelinck. (Not offered 1975-76.)

### MUSIC

404 Keyboard Music: 1630-1770 (3) A

Terry 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. (Not offered 1974-75.)

### MUSIC

407 Baroque Solo Song (3) Monody and cantata, Caccini through Handel. (Not offered 1974-75.)

### MUSIC

### 408 The German Lied (3) A Terry

through Strauss. Schubert (Not offered 1975-76.)

### MUSIC

French Art-Song: 1850 to the Present (3) 409 Terry

Faure through Poulenc. (Not offered 1974-75.)

### MUSIC

410 Chamber Music: 1660-1770 (3) W

Harman Frescobaldi through Bach. (Not offered 1974-75.)

### MUSIC

411 Chamber Music: 1770-1830 (3) Haydn through Schubert. (Not 1974-75.) offered

### MUSIC

412 Chamber Music: 1830-1920 (3) Schumann through Ravel. (Not offered 1974-75.)

### MUSIC

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1975-76.)

MUSIC

offered 1975-76.)

Irvine

Irvine

the Impressionists.

Harman

Terry

Haydn through Berlioz.

413 Orchestral Music: 1620-1760 (3) W Harman Corelli through the Mannheim School. (Not

414 Orchestral Music: 1760-1850 (3) A

415 Orchestral Music: 1850-1920 (3) W

416 Choral Music: 1600-1770 (3) Sp

417 Choral Music of Bach (3) Sp

Liszt through Elgar; the National Schools and

Monteverdi through Handel. (Not offered

The cantatas and larger works. Choral compo-

sitions of Bach's immediate predecessors.

### MUSIC

Choral Music: 1770-1850 (3) A 418 Terry

Large works for chorus and orchestra. Haydn through Berlioz. (Not offered 1974-75.)

### MUSIC

# 419 Choral Music: 1850 to the Present (3) Sp Terry

Selected choral masterpieces. Brahms through Britten. (Not offered 1974-75.)

### MUSIC

420 Opera: 1600-1750 (3) Sp

### MUSIC

421 Opera: 1750-1850 (3) Sp

Trov

Gluck through Bellini. (Not offered 1975-76.)

### MUSIC

422 Opera: 1850-1920 (3) A

Troy Wagner through Puccini.

### MUSIC

423 Music in the Twentieth Century (3) Sp Clarke

Western art music from Debussy to the present, emphasizing techniques adapted from other arts, sciences, continents, and centuries. (Not offered 1974-75.)

### MUSIC

# 424 Conspectus of the History of Music to 1760 (5) W

Harman, Troy

Concentrated course in Renaissance, Baroque, and preclassical music. Intended primarily for senior transfers and graduates.

### MUSIC

### 425 Conspectus of the History of Music From 1760 (5) Sp

Irvine, Troy

Concentrated course in classical, nineteenthand 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

The Curriculum in Music Education (2) 431 Sp

Prerequisite, student teaching.

### MUSIC

432 The General Music Class (3) Sp Reeder

The teaching of music and its literature in nonperforming classes on the junior and senior high school level. Prerequisite, 340.

### MUSIC

MUSIC 433 Music of Latin America (3) The Indian, African, and European music of the Spanish-, French-, and Portuguese-speaking New World countries. Prerequisites, 316, 317, 318.

### MUSIC

434, 435, 436 · Pedagogy (2,2,2) A,W,Sp Harris, Heinitz, Hokanson, Moore

Principles of effective studio teaching; survey and evaluation of teaching materials.

### MUSIC

437 Harmonic Analysis (3)

### MUSIC

438 Psychology of Music (3) A or W 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.

### MUSIC

442 Instrumental Curriculum: Methods and Materials (3) A

### Jussila

Study of the organization and administration of school instrumental music; the selection and use of materials and teaching strategies from beginning to advanced levels of instrumental instruction. Prerequisites, 340 and permission.

### MUSIC

**Choral Curriculum: Methods and** 443 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

University Chorale (1, max. 12) AWSp 450 Eichenberger

### MUSIC

451 Madrigal Singers (1, max. 12) AWSp Kechlev

359

### 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 Problems in Twentieth-Century Ensemble (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.

Beale, Benshoof, Bergsma, Dorsey, Kechley, Smith, Tufts

One half-hour private lesson and a one-hour

laboratory session each week. Prerequisite, 391.

Practical experience with problems of the

The music of Japan from earliest known record

The music of Japan from 1700 to the present.

**Special Topics in Music Education** 

Special studies designed to reflect contemporary emphases and concerns in the music education profession.

The music of China from the earliest times to

the present. Prerequisites, 316, 317, 318.

until 1700. Prerequisites, 316, 317, 318.

492, 493 Opera Direction and Production

### MUSIC

488 Contemporary Idioms (3) W

### MUSIC

489 Musical Forms (3) Sp

### MUSIC 490 Orchestration (3) Sp

MUSIC 491 Composition (2, max. 12) AWSp

MUSIC

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MUSIC

496

(4,4) A,W

Rosinbum

494 Music of Japan (3)

495 Music of Japan (3)

Prerequisites, 316, 317, 318.

(1-3, max. 10) S

497 Music of China (3)

theater. Prerequisite, 492 for 493.
### 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 501: chant to middle Baroque. 502: high Ba-

roque through nineteenth century. 503: impressionists to present.

### MUSIC

504 Seminar in Medieval Music (3, max. 6) Sp Harman

Prerequisite, 400. (Not offered 1974-75.)

### MUSIC

### 505 Seminar in Renaissance Music (3, max. 6) A

Harman

Prerequisite, one or more courses from 401, 402, and 403. (Not offered 1974-75.)

### MUSIC

506 Seminar in Baroque Music (3, max. 6) W Terry

Prerequisite, one or more courses from 404, 407, 410, 413, 416, 417, or 420.

### MUSIC

507 Seminar in Rococo and Pre-Classical Music: 1700-1760 (3, max. 6) Sp Harman

Prerequisite, one or more courses from 404, 410, 413, 420. (Not offered 1974-75.)

### MUSIC

508 Seminar in the Viennese Classical Period: 1760-1830 (3, max. 6) Sp

Terry

Prerequisite, one or more courses from 405, 411, 414, 418, or 421. (Not offered 1975-76.)

### MUSIC

509 Seminar in Nineteenth-Century Music: 1830-90 (3, max. 6) A

Irvine Prerequisite, one or more courses from 406, 408, 409, 412, 415, 419, or 422. (Not offered 1975-76.)

### MUSIC

510 Seminar in Music Since 1890 (3, max. 6) W

Clarke

Prerequisite, one or more courses from 406, 408, 409, 412, 415, 419, 422, or 423. (Not offered 1974-75.)

### MUSIC

511 Seminar in Field and Laboratory Methods (3)

### Kauffman

Study of the methodology of research in eth-

nomusicology 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. (Not offered 1974-75.)

### MUSIC

514 Systematic Musicology (3) A Carlsen

Use of the scientific method and empirical research procedures in musical investigation.

### MUSIC

515 Medieval Notation: To 1400 (3) Sp Harman

Gregorian chant through the Mannered School. (Not offered 1975-76.)

### MUSIC

516 Renaissance Notation: 1400-1600 (3) W Harman

Dunstable through De Rore; lute and keyboard tablatures. Prerequisite, 401. (Not offered 1974-75.)

### MUSIC

517 Seminar in Musical Styles (3, max. 6) W Clarke

Investigations into the stylistic criteria for specific composers and groups of composers. (Not offered 1975-76.)

### MUSIC

### 518 Aesthetics (3) W

Esthetic theories; practical aspects of esthetics in relation to music criticism, composition, and performance.

### MUSIC

## 519 Seminar: Editing of Early Music (3, max. 6) A

Terry

The study of performance practices through the editing of vocal and instrumental music of the seventeenth and early eighteenth centuries. Problems of ornamentation, bowing, figured bass, notation, etc. Collaborative student preparation and conducting of old scores. (Not offered 1975-76.)

### MUSIC

520 Seminar in American Music (3, max. 6) Sp

Clarke

Research in the life, works, and times of composers in the United States from colonial days to the present. (Not offered 1975-76.)

### MUSIC

### 521 Selected Topics in Musical Perception (3) 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

A study of the art of invention, canon, and fugue in the twentieth century, from both analytic and practical viewpoints.

360

### MUSIC

523 Music and Society (3) A Shrader

### MUSIC

524 Seminar in Music Education (3) W Cooper

Special problems in the teaching and supervision of music in the elementary grades. Prerequisites, one year of teaching experience.

### MUSIC

525 Seminar in Music Education (3) W Jussila

Special problems in the teaching and administration of music in the secondary school and junior college. Prerequisites, one year of teaching experience.

### MUSIC

### 526, 527, 528 History of Theory (3,3,3) A,W,Sp

526: ancient, medieval, early Renaissance. 527: Renaissance, Baroque, early classic. 528: classic, romantic, twentieth century.

### MUSIC

### 529 Practicum in Teaching Elementary Music Methods (3) Sp

Cooper

Elementary music education curriculum, methods, and materials. Prerequisites, 524 and teaching experience.

### MUSIC

### 530 Seminar in Musical Learning (3, max. 6) Carlsen

Study of learning research as it relates to nonverbal musical learning. Prerequisite, 438.

### MUSIC

MUSIC

theatre.

MUSIC

MUSIC

MUSIC

537

### 531 Experimental Design in Musical Research (3)

Carlsen

max. 12) AWSp

Rosinhum

Experimental and quasi-experimental research designs and the application of experimental research methods to the investigation of problems in music teaching and learning, performance, and theoretical studies. Prerequisites, 514, and Psychology 303 or EDPSY 490.

532 Opera Direction and Production (4 or 6,

Practical experience with problems of the opera

Graduate course dealing with basic literature in

ethnomusicology; laboratory and listening sec-

tions meeting concurrently, 533 with 316; 534

Study of practice in different notational ana-

lytical systems used in non-Western music. Pre-

Seminar on Opera (3, max. 6) Sp

420, 421, or 422, or permission.

Seminar on music history, providing a comple-

ment to history of opera series (420, 421, and

422.) Prerequisite, one or more courses from

533, 534, 535 Preceptorial Reading in Ethnomusicology (5,5,5) A,W,Sp

536 Transcription and Analysis (3)

Garfias, Kauffman

with 317; and 535 with 318.

Kauffman

requisite, 471.

Trov

### MUSIC

559 Master's Recital (2, max. 4) AWSp Public performance for students in the Master of Music program.

### 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

Graduate Composition (\*) AWSp 591 Beale, Benshoof, Bergsma, Dorsey, Kechley, Smith, Tufis

### MUSIC

595, 596, 597 Practicum in Systematic Musicology (2,2,2) A,W,Sp Carlsen

Direct systematic research experience under the tutelage of a faculty member on a current faculty research project. The practicum is intended to complement courses in systematic research methodology by permitting the student to par-ticipate 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

### **Courses for Undergraduates**

Courses 140 through 159 are private instruction primarily for majors not specializing in performance. Also available to qualified nonmajors. Prerequisites, examination and permission.

### MUSAP

140 Private Instruction: Piano (2-3, max. 9) AWSp

### MUSAP

- 141 Private Instruction: Violin-Viola (2-3, max. 9) AWSp
  - McInnes, Sokol, Zsigmondy

### MUSAP

142 Private Instruction: Voice (2-3, max. 9) AWSp Curtis-Verna, Harris, Lishner, Mesler

### MUSAP

143 Private Instruction: Violoncello (2-3, max. 9) AWSp Heinitz

### MUSAP

144 Private Instruction: Double Bass (2-3, max. 9) AWSp Harnett

### MUSAP

145 Private Instruction: Organ (2-3, max. 9) AWSp Eichinger

### MUSAP

- 146 Private Instruction: Flute (2-3, max. 9) AWSp Skowronek, Welke

### MUSAP

147 Private Instruction: Oboe (2-3, max, 9) AWSp Storch

### MUSAP

148 Private Instruction: Clarinet (2-3, max. 9) AWSp McColl, Welke

### MUSAP

149 Private Instruction: Bassoon (2-3, max. 9) AWSD Grössman

### MUSAP

150 Private Instruction: Saxophone (2-3, max. 9) AWSp Brazil

### MUSAP

- 151 Private Instruction: Horn (2-3, max. 9) AWSD Leuba, Welke

### MUSAP

152 Private Instruction: Trumpet (2-3, max. 9) AWSp Cummings, Welke

### MUSAP

153 Private Instruction: Trombone (2-3, max. 9) AWSp Dempster

## MUSAP

154 Private Instruction: Tuba (2-3, max. 9) AWSp

## Leuba, Welke

- MUSAP
- 155 Private Instruction: Harp (2-3, max. 9) AWSp Vokolek

### MUSAP

Private Instruction: Percussion (2-3, max. 156 9) AWSp Shrader

MUSAP 157 Private Instruction: Harpsichord (2-3, max. 9) AWSp Kind

### MUSAP

158 Private Instruction: Viola da Gamba (2-3, max. 9) AWSp Heinitz

### MUSAP

**Private Instruction: Non-Western** 159 Instruments (2-3, max. 9) AWSp

### Courses 160 through 178 are for music majors specializing in performance.

### MUSAP

Private Instruction: Piano (3-4, max. 12) 160 AWSD Geissmar, Hokanson, Moore, O'Doan, Siki

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## ARTS AND SCIENCES

### MUSAP

161 Private Instruction: Violin-Viola (3-4, max. 12) AWSp McInnes, Sokol, Zsigmondy

### MUSAP

162 Private Instruction: Voice (3-4, max. 12) AWSp

Curtis-Verna, Harris, Lishner, Mesler MUSAP

### 163 Private Instruction: Violoncello (3-4, max. 12) AWSp Heinitz

MUSAP

### 164 Private Instruction: Double Bass (3-4, max. 12) AWSp Harnett

### MUSAP

165 Private Instruction: Organ (3-4, max. 12) AWSp Eichinger

### MUSAP

166 Private Instruction: Flute (3-4, max. 12) AWSp

### Skowronek, Welke

- MUSAP
- 167 Private Instruction: Oboe (3-4, max. 12) AWSp Storch

### MUSAP

- 168 Private Instruction: Clarinet (3-4, max. 12) AWSp McColl, Welke
- MUSAP 169 Private Instruction: Bassoon (3-4, max.
  - 12) AWSp
  - Grossman

### MUSAP

170 Private Instruction: Saxophone (3-4, max. 12) AWSp Brazil

### MUSAP

171 Private Instruction: Horn (3-4, max. 12) AWSD Leuba, Welke

173 Private Instruction: Trombone (3-4, max.

174 Private Instruction: Tuba (3-4, max. 12)

175 Private Instruction: Harp (3-4, max. 12)

176 Private Instruction: Percussion (3-4, max.

177 Private Instruction: Harpsichord (3-4,

12) AWSp

12) AWSp

Dempster

AWSp Leuba, Welke

AWSD

Vokolek

12) AWSp

max. 12) AWSp

Shrader

Kind

Cummings, Welke

### MUSAP 172 Private Instruction: Trumpet (3-4, max.

MUSAP

MUSAP

MUSAP

MUSAP

MUSAP

### MUSAP

178 Private Instruction: Viola da Gamba (3-4, max. 12) AWSp Heinitz

Courses 240 through 259 are private instruction primarily for majors not specializing in performance. Also available to qualified nonmajors. Prerequisites, examination and permission.

### MUSAP

240 Private Instruction: Piano (2-3, max. 9) AWSp Geissmar, Hokanson, Moore, O'Doan, Siki

### MUSAP

241 Private Instruction: Violin-Viola (2-3, max. 9) AWSp McInnes, Sokol, Zsigmondy

### MUSAP

242 Private Instruction: Voice (2-3, max. 9) AWSp Curtis-Verna, Harris, Lishner, Mesler

### MUSAP

243 Private Instruction: Violoncello (2-3, max. 9) AWSp Heinitz

### MUSAP

244 Private Instruction: Double Bass (2-3, max. 9) AWSp Harnett

### MUSAP

245 Private Instruction: Organ (2-3, max. 9) AWSD Eichinger

### MUSAP

246 Private Instruction: Flute (2-3, max. 9) AWSp Skowronek, Welke

### MUSAP

247 Private Instruction: Oboe (2-3, max. 9) AWSD Storch

### MUSAP

248 Private Instruction: Clarinet (2-3, max. 9) AWSp McColl, Welke

### MUSAP

249 Private Instruction: Bassoon (2-3, max. 9) AWSD Grossman

### MUSAP

250 Private Instruction: Saxophone (2-3, max. 9) AWSp Brazil

### MUSAP

251 Private Instruction: Horn (2-3, max. 9) AWSD Leuba, Welke

### MUSAP

252 Private Instruction: Trumpet (2-3, max. 9) AWSp Cummings, Welke

### MUSAP

253 Private Instruction: Trombone (2-3, max. 9) AWSp Dempster

### MUSAP

254 Private Instruction: Tuba (2-3, max. 9) AWSD Leuba, Welke

### MUSAP

255 Private Instruction: Harp (2-3, max. 9) AWSp Vokolek

### MUSAP

256 Private Instruction: Percussion (2-3, max. 9) AWSp Shrader

### MUSAP

257 Private Instruction: Harpsichord (2-3, max. 9) AWSp Kind

### MUSAP

258 Private Instruction: Viola da Gamba (2-3, max. 9) AWSp Heinitz

### MUSAP

Private Instruction: Non-Western 259 Instruments (2-3, max. 9) AWSp

Courses 260 through 278 are for music majors specializing in performance.

### MUSAP

- 260 Private Instruction: Piano (3-4, max. 12) AWSp Geissmar, Hokanson, Moore, O'Doan, Siki
- MUSAP 261 Private Instruction: Violin-Viola (3-4, max. 12) AWSp McInnes, Sokol, Zsigmondy

### MUSAP

- 262 Private Instruction: Voice (3-4, max. 12) AWSp Curtis-Verna, Harris, Lishner, Mesler
- MUSAP
- 263 Private Instruction: Violoncello (3-4, max. 12) AWSp Heinitz

### MUSAP

264 Private Instruction: Double Bass (3-4, max. 12) AWSp Harnett

### MUSAP

265 Private Instruction: Organ (3-4, max. 12) AWSD Eichinger

### MUSAP

266 Private Instruction: Flute (3-4, max. 12) AWSp Skowronek, Welke

MUSAP 267 Private Instruction: Oboe (3-4, max. 12) AWSp Storch

### MUSAP

268 Private Instruction: Clarinet (3-4, max. 12) AWSp McColl, Welke

### MUSAP

Private Instruction: Bassoon (3-4, max. 269 12) AWSp Grossman

MUSAP

270 Private Instruction: Saxophone (3-4, max. 12) AWSp Brazil

### MUSAP

271 Private Instruction: Horn (3-4, max. 12) AWSp Leuba, Welke

### MUSAP

272 Private Instruction: Trumpet (3-4, max. 12) AWSp Cummings, Welke

### MUSAP

273 Private Instruction: Trombone (3-4, max. 12) AWSp Dempster

### MUSAP

274 Private Instruction: Tuba (3-4, max. 12) AWSD Leuba, Welke

MUSAP 275 Private Instruction: Harp (3-4, max. 12) AWSp Vokolek

### MUSAP

276 Private Instruction: Percussion (3-4, max. 12) AWSp Shrader

### MUSAP

277 Private Instruction: Harpsichord (3-4, max. 12) AWSp Kind

### MUSAP

278 Private Instruction: Viola da Gamba (3-4, max. 12) AWSp Heinitz

Courses 340 through 359 are private instruction primarily for majors not specializing in performance. Also available to qualified nonmajors. Prerequisites, examination and permission.

### MUSAP

340 Private Instruction: Piano (2-3, max. 9) AWSp Geissmar, Hokanson, Moore, O'Doan, Siki

### MUSAP

341 Private Instruction: Violin-Viola (2-3, max. 9) AWSp McInnes, Sokol, Zsigmondy

### MUSAP

342 Private Instruction: Voice (2-3, max. 9) AWSp Curtis-Verna, Harris, Lishner, Mesler

- MUSAP 343 Private Instruction: Violoncello (2-3,
- max. 9) AWSp Heinitz

### MUSAP

344 Private Instruction: Double Bass (2-3, max. 9) AWSp Harnett

### MUSAP

345 Private Instruction: Organ (2-3, max. 9) AWSp Eichinger

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### MUSAP

346 Private Instruction: Flute (2-3, max. 9) AWSp Skowronek, Welke

### MUSAP

347 Private Instruction: Oboe (2-3, max. 9) AWSp Storch

### MUSAP

348 Private Instruction: Clarinet (2-3, max. 9) AWSp McColl, Welke

### MUSAP

349 Private Instruction: Bassoon (2-3, max. 9) AWSp Grossman

### MUSAP

 350 Private Instruction: Saxophone (2-3, max.
 9) AWSp Brazil

### MUSAP

351 Private Instruction: Horn (2-3, max. 9) AWSp Leuba, Welke

### MUSAP

 352 Private Instruction: Trumpet (2-3, max.
 9) AWSp Cummings, Welke

### MUSAP

 353 Private Instruction: Trombone (2-3, max.
 9) AWSp Dempster

### MUSAP

354 Private Instruction: Tuba (2-3, max. 9) AWSp Leuba, Welke

### MUSAP

355 Private Instruction: Harp (2-3, max. 9) AWSp Vokolek

### MUSAP

 356 Private Instruction: Percussion (2-3, max.
 9) AWSp Shrader

### MUSAP

357 Private Instruction: Harpsichord (2-3, max. 9) AWSp Kind

### MUSAP

358 Private Instruction: Viola da Gamba (2-3, max. 9) AWSp Heinitz

### MUSAP

359 Private Instruction: Non-Western Instruments (2-3, max. 9) AWSp

Courses 360 through 378 are for music majors specializing in performance.

### MUSAP

360 Private Instruction: Plano (3-4, max. 12) AWSp Geissmar, Hokanson, Moore, O'Doan, Sibi

### MUSAP

361 Private Instruction: Violin-Viola (3-4, max. 12) AWSp McInnes, Sokol, Zsigmondy

## MUSAP

- 362 Private Instruction: Voice (3-4, max. 12) AWSp Curtis-Verna, Harris, Lishner, Mesler
- MUSAP 363 Private Instruction: Violoncello (3-4,
- max. 12) AWSp Heinitz

### MUSAP

364 Private Instruction: Double Bass (3-4, max. 12) AWSp Harnett

### MUSAP

365 Private Instruction: Organ (3-4, max. 12) AWSp Eichinger

### MUSAP

366 Private Instruction: Flute (3-4, max. 12) AWSp Skowronek, Welke

### MUSAP

367 Private Instruction: Oboe (3-4, max. 12) AWSp Storch

### MUSAP

368 Private Instruction: Clarinet (3-4, max. 12) AWSp McColl, Welke

### MUSAP

 369 Private Instruction: Bassoon (3-4, max. 12) AWSp Grossman

### MUSAP

370 Private Instruction: Saxophone (3-4, max. 12) AWSp Brazil

### MUSAP

371 Private Instruction: Horn (3-4, max. 12) AWSp Leuba, Welke

### MUSAP

 372 Private Instruction: Trumpet (3-4, max.
 12) AWSp Cummings, Welke

### MUSAP

 373 Private Instruction: Trombone (3-4, max. 12) AWSp Dempster

### MUSAP

374 Private Instruction: Tuba (3-4, max. 12) AWSp Leuba, Welke

### MUSAP

375 Private Instruction: Harp (3-4, max. 12) AWSp Vokolek

### MUSAP

 376 Private Instruction: Percussion (3-4, max. 12) AWSp Shrader

### MUSAP

 377 Private Instruction: Harpsichord (3-4, max. 12) AWSp
 Kind

### MUSAP

 378 Private Instruction: Viola da Gamba (3-4, max. 12) AWSp Heinitz

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## ARTS AND SCIENCES

Courses 440 through 459 are private instruction primarily for majors not specializing in performance. Also available to qualified nonmajors. Prerequisites, examination and permission.

### MUSAP

440 Private Instruction: Piano (2-3, max. 18) AWSp

Geissmar, Hokanson, Moore, O'Doan, Siki

### MUSAP

441 Private Instruction: Violin-Viola (2-3, max. 18) AWSp McInnis, Sokol, Zsigmondy

### MUSAP

- 442 Private Instruction: Voice (2-3, max. 18) AWSp
  - Curtis-Verna, Harris, Lishner, Mesler

### MUSAP

443 Private Instruction: Violoncello (2-3, max. 18) AWSp Heinitz

### MUSAP

444 Private Instruction: Double Bass (2-3, max. 18) AWSp Harnett

### MUSAP

445 Private Instruction: Organ (2-3, max. 18) Eichinger

### MUSAP

446 Private Instruction: Flute (2-3, max. 18) AWSp

### Skowronek, Welke

- MUSAP
- 447 Private Instruction: Oboe (2-3, max. 18) AWSp Storch

### MUSAP

 448 Private Instruction: Clarinet (2-3, max. 18) AWSp McColl, Welke

### MUSAP

 449 Private Instruction: Bassoon (2-3, max. 18) AWSp Grossman

### MUSAP

450 Private Instruction: Saxophone (2-3, max. 18) AWSp Brazil

### MUSAP

451 Private Instruction: Horn (2-3, max. 18) AWSp Leuba, Welke

### \_\_\_\_\_

18) AWSp

Dempster

AWSp

Leuba, Welke

MUSAP

MUSAP

MUSAP

453

 452 Private Instruction: Trumpet (2-3, max.
 18) AWSp Cummings, Welke

454 Private Instruction: Tuba (2-3, max. 18)

Private Instruction: Trombone (2-3, max.

### MUSAP

455 Private Instruction: Harp (2-3, max. 18) AWSp Vokolek

### MUSAP

 456 Private Instruction: Percussion (2,3, max. 18) AWSp Shrader

### MUSAP

457 Private Instruction: Harpsichord (2-3, max. 18) AWSp Kind

### MUSAP

 458 Private Instruction: Viola da Gamba (2-3, max. 18) AWSp Heinitz

### MUSAP

459 Private Instruction: Non-Western Instruments (2-3, max. 18) AWSp

Courses 460 through 478 are for music majors specializing in performance.

### MUSAP

460 Private Instruction: Plano (3-4, max. 18) AWSp Geissmar, Hokanson, Moore, O'Doan, Siki

### MUSAP

461 Private Instruction: Violin-Viola (3-4, max. 18) AWSp McInnes, Sokol, Zsigmondy

### MUSAP

462 Private Instruction: Voice (3-4, max. 18) AWSp Curtis-Verna, Harris, Lishner, Mesler

### MUSAP

 463 Private Instruction: Violoncello (3-4, max. 18) AWSp Heinitz

### MUSAP

464 Private Instruction: Double Bass (3-4, max. 18) AWSp Harnett

### MUSAP

 465 Private Instruction: Organ (3-4, max. 18)
 AWSp Eichinger

### MUSAP

 466 Private Instruction: Flute (3-4, max. 18)
 AWSp Skowronek, Welke

### MUSAP

467 Private Instruction: Oboe (3-4, max. 18) AWSp Storch

### MUSAP

 468 Private Instruction: Clarinet (3-4, max. 18) AWSp McColl, Welke

### MUSAP

 469 Private Instruction: Bassoon (3-4, max. 18) AWSp Grossman

### MUSAP

470 Private Instruction: Saxophone (3-4, max. 18) AWSp Brazil

### MUSAP

 471 Private Instruction: Horn (3-4, max. 18)
 AWSp Leuba, Welke

### MUSAP

472 Private Instruction: Trumpet (3-4, max. 18) AWSp Cummings, Welke

### MUSAP

473 Private Instruction: Trombone (3-4, max. 18) AWSp Demoster

### MUSAP

474 Private Instruction: Tuba (3-4, max. 18) AWSp Leuba, Welke

### MUSAP

475 Private Instruction: Harp (3-4, max. 18)
 AWSp
 Vokolek

### MUSAP

476 Private Instruction: Percussion (3-4, max.
 18) AWSp
 Shrader

### MUSAP

477 Private Instruction: Harpsichord (3-4, max. 18) AWSp Kind

### MUSAP

 478 Private Instruction: Viola da Gamba (3-4, max. 18) AWSp Heinitz

### **Courses for Graduates Only**

Courses 560 through 578 are for graduate performance majors.

### MUSAP

560 Private Instruction: Plano (3, max. 27) AWSp Geissmar, Hokanson, Moore, O'Doan, Siki

### MUSAP

 561 Private Instruction: Violin-Viola (3, max. 27) AWSp McInnes, Sokol, Zsigmondy

### MUSAP

562 Private Instruction: Volce (3, max. 27) AWSp Curtis-Verna, Harris, Lishner, Mesler

### MUSAP

 563 Private Instruction: Violoncello (3, max. 27) AWSp Heinitz

### MUSAP

 564 Private Instruction: Double Bass (3, max. 27) AWSp Harnett

### MUSAP

565 Private Instruction: Organ (3, max. 27) AWSp Eichinger

### MUSAP

566 Private Instruction: Flute (3, max. 27) AWSp Skowronek, Welke

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### MUSAP 567 Private Instruction: Oboe (3, max. 27) AWSp Storch

### MUSAP

568 Private Instruction: Clarinet (3, max. 27) AWSp McColl, Welke

### MUSAP

569 Private Instruction: Bassoon (3, max. 27) AWSp Grossman

### MUSAP

 570 Private Instruction: Saxophone (3, max. 27) AWSp Brazil

### MUSAP

571 Private Instruction: Horn (3, max. 27) AWSp Leuba, Welke

### MUSAP

572 Private Instruction: Trumpet (3, max. 27) AWSp Cummings, Welke

### MUSAP

 573 Private Instruction: Trombone (3, max. 27) AWSp Demoster

### MUSAP

574 Private Instruction: Tuba (3, max. 27) AWSp Leuba, Welke

### MUSAP

575 Private Instruction: Harp (3, max. 27) AWSp Vokolek

### MUSAP

576 Private Instruction: Percussion (3, max. 27) AWSp Shrader

- MUSAP 577 Private Instruction: Harpsichord (3, max. 27) AWSp
  - Kind

### MUSAP

578 Private Instruction: Viola da Gamba (3, max. 27) AWSp Heinitz

### NEAR EASTERN LANGUAGES AND LITERATURE

### **Courses for Undergraduates**

### ARABIC

### ARAB

101-102, 103 Elementary Arabic (5-5,5) A,W,Sp

### Heer, Ziadeh

101-102: intensive study of grammar, with oral and written drill and reading of simple texts.

### ARAB

111-112, 113 Eastern Arabic: The Spoken Arabic of Palestine, Syria, Lebanon, and Egypt (5-5,5) 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, Ziadeh

Reading of selected texts in literary Arabic, with continuing emphasis on grammar and syntax. Prerequisites, 103 for 201; 201 for 202; 202 for 203.

## ARAB

401 Adab Prose: Jahiz (3) A

Heer, MacKay, Ziadeh

Readings in early Arabic prose, especially the writings of Jahiz. Prerequisite, 203 or equivalent. (Offered alternate years.)

### ARAB

### 402 Maqamat (Assemblies): Hamadhana, Hariri (3) W

MacKay, Ziadeh

Reading of several *maqamat* (essays in rhymed prose) of al-Hamadhani and al-Hariri. Examination of the *maqamat* genre as a whole. Pre-requisite, 203 or equivalent. (Offered alternate years.)

### ARAB

403 Historians: Tabari (3) Sp

Heer, MacKay, Ziadeh

Readings in Arab historians with particular reference to al-Tabari and his school of historical writing. Prerequisite, 203 or equivalent. (Offered alternate years.)

### ARAB

### 404 Quran and Tafsir (3) A Ziadeh

Reading of various sections from the Qur'an with the relevant exegetical writings on religious, philological, and grammatical points. Prerequisite, 203 or equivalent. (Offered alternate years.)

### ARAB

### 405 Hadith and Law (3) W

Ziadeh

Selected readings from the traditions (hadith) of Muhammad, and from works on jurisprudence and law based on the holy texts. Prereqquisite, 203 or equivalent. (Offered alternate years.)

### ARAB

### 406 Islamic Political Theorists (3) Sp Ziadeh

Readings from the main political theorists: al-Baghdadi, al-Mawardi, and Ibn Khaldun. Prerequisite, 203 or equivalent. (Offered alternate years.)

### ARAB

### 411 Desert Poetry: Pre-Islamic and Umayyad (3) A

Heer, MacKay, Ziadeh

Reading and analysis of selected poems from pre-Islamic and Umayyad times. Prerequisite, 203 or equivalent. (Offered alternate years.)

### ARAB

### 412 Urban Poetry: The New 'Abbasid Poetry (3) W

Heer, MacKay, Ziadeh

Reading of the new poetry of the 'Abbasid period and studying of the social and political factors that gave rise to it; al-Mutanabbi and al-Ma'arri. Prerequisite, 203 or equivalent. (Offered alternate years.)

### ARAB

413 Modern Poetry (3) Sp

Heer, Ziadeh 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, Ziadeh

Selections from modern essays, fiction, and ideological writings. Prerequisite, 203 or equivalent. (Offered alternate years.)

### ARAB

490 Supervised Study (1-6, max. 18) AWSp Heer, MacKay, Ziadeh

Special work in literary texts for graduates and undergraduates. Prerequisite, 203 or equivalent.

### ARAB

499 Undergraduate Research (1-6, max. 18) AWSp

### HEBREW

HEBR

101-102, 103 Elementary Hebrew (5-5,5) A,W,Sp

### Podet

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

### Podet

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

411, 412, 413 Classical Hebrew Poetry (3,3,3) A,W,Sp Clear

Readings in classical Hebrew poetry: Psalms

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and Wisdom literature. Prerequisites, 203 or permission for 411; 411 for 412; 412 for 413. (Offered alternate years.)

### HEBR

### 421 Advanced Post-Biblical Hebrew: Aggadic Narrative (3) A Podet

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 Podet

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

Podet

Advanced readings in modern Hebrew narrative, with emphasis on the short narratives of Chaim Nahman Bialik. Oral practice is included. Prerequisite, 203 or equivalent.

### HEBR

### 431 Canaanite and Hebrew Inscriptions (3) Sp

Clear

Readings in the Canaanite (Phoenician) and Hebrew inscriptions in facsimile. Studies of the development of the Canaanite script and dialects. Prerequisite, 203 or equivalent. (Offered alternate years.)

### HEBR

### 441, 442, 443 Septuagint Studies (3,3,3) 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: Siddir, Mahzör, Haggādāh (3,3,3) A,W,Sp

Podet

Reading of the classical liturgy, including a study of its development and changes. Reforms and modern variations in the liturgy. Prerequisites, 203 or permission for 451; 451 for 452; 452 for 453. (Offered alternate years.)

### HEBR

490 Supervised Study (1-6, max. 18) AWSp Special work in literary texts for graduates and undergraduates. Prerequisite, 203 or equivalent.

499 Undergraduate Research (1-6, max. 18)

401, 402, 403 Elementary Akkadian (3,3,3) A,W,Sp Clear

Introduction to the Akkadian language (As-

syrian and Babylonian). Graded readings in

Latin characters from historical, legal, and lit-

erary texts. Prerequisites, Hebrew or Arabic 203 or equivalent for 401; 401 for 402; 402 for

403. (Offered every third year.)

### HEBR

AWSp

AKKADIAN

AKKAD

### AKKAD

421, 422, 423 Intermediate Akkadian (3,3,3) A,W,Sp Clear

Readings in Akkadian Gilgamesh and Creation epics, historical descriptions. Introduction to the cuneiform script. Prerequisites, 403 for 421; 421 for 422; 422 for 423. (Offered every third year.)

### ARAMAIC

### ARAM

401 Biblical Aramaic (3) A Clear

Introduction to biblical Aramaic (Ezra, Daniel). Selections from Targumim. Prerequisite, Hebrew 203 or equivalent. (Offered alternate years.)

### ARAM

411 Aramaic Epigraphy (3) Sp

Clear Readings in the Aramaic Inscriptions and the Elephantine Papyri. Prerequisite, Hebrew 203 or equivalent. (Offered alternate years.)

### UGARITIC

UGAR

401, 402, 403 Ugaritic Language and Literature (3,3,3) A,W,Sp Clear

Readings in the Ugaritic texts from Ras Shamra, Epic, Mythological, and other texts. Prerequisite, intermediate knowledge of a cognate Ianguage (Akkadian, Arabic, Aramaic, Hebrew). (Offered every third year.)

### 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 Firdawsi (3) Sp Lorgine

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 herces. 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

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, Arabic 103 or Persian 103.

### TKISH

401 Tanzimat Poetry and Prose (3) A Andrews

Readings from the poetry and prose of the Tanzimat period. Prerequisite, 400 or permission. (Offered alternate years.)

### TKISH

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

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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

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

## NEAR EASTERN COURSES IN ENGLISH

NE

210 Introduction to Islamic Civilization and Culture (5) A

Andrews, Clear, Heer, Loraine, MacKay, Ziadeh

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 quarterly.

NE

NE

420 Islamic Religious Literature in English (3)

Heer

Heer

and medicine.

Readings in Islamic theology and mysticism.

Readings in philosophy, the physical sciences,

422 Islamic Philosophical and Scientific

Literature in English (3)

# 0

## 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

### **Courses for Graduates Only**

### ARABIC

### ARAB

471, 472, 473 Arabic as a Second Near Eastern Language (3,3,3) A,W,Sp Heer, Ziadeh

Designed for graduate students with some proficiency in a Near Eastern language who plan to embark upon a second Near Eastern language, Arabic. The student is expected to participate fully in the elementary Arabic course; however, the student's work, wherever possible, is supervised by his or her major language instructor who, in consultation with the instructor of elementary Arabic, assigns supplementary work designed to accelerate the student's ability to use Arabic in conjunction with 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, Ziadeh

Designed for graduate students with some proficiency in a Near Eastern Language who plan to take a second year of Arabic as a second Near Eastern language. Students are expected to participate fully in the intermediate Arabic course; however, their work, wherever possible, is supervised by their major language instructors who, in consultation with the instructor of Arabic, assign supplementary work designed to accelerate the students' ability to use Arabic in conjunction with their major language. The major language instructor also participates in assigning a grade for the course. Prerequisites, above elementary knowledge of one Near Eastern language (not Arabic), elementary knowledge of Arabic, and graduate standing.

### ARAB

600 Independent Study or Research (\*) AWSp

Ausp

### HEBREW

### HEBR

471, 472, 473 Hebrew as a Second Near Eastern Language (3,3,3) A,W,Sp Podet

Designed for graduate students embarking upon the study of Hebrew as their second Near Eastern language, this series is organized in the same manner as Arabic 471, 472, and 473, and the prerequisites are analogous.

### HEBR

### 474 Hebrew as a Second Near Eastern Language: Second Year (3, max. 9)

See Arabic 474 for course description. Prerequisites, above elementary knowledge of one Near Eastern language (not Hebrew), elementary knowledge of Hebrew, and graduate standing.

### HEBR

600 Independent Study or Research (\*) AWSp

### NEAR EAST

### NE

- 520 Seminar on Near Eastern Civilization and Thought (3, max. 27)
- NE

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 Loraine

Designed for graduate students embarking upon the study of Persian as their second Near Eastern language, this series is organized in the same manner as Arabic 471, 472, and 473, and the prerequisites are analogous.

### PRSAN

474 Persian as a Second Near Eastern Language: Second Year (3, max. 9)

See Arabic 474 for course description. Prerequisites, above elementary knowledge of one Near Eastern language (not 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 Arabic 471, 472, and 473, and the prerequisites are analogous.

### TKISH

### 474 Turkish as a Second Near Eastern

Language: Second Year (3, max. 9) See Arabic 474 for course description. Prerequisites, above elementary knowledge of one Near Eastern language (not 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 nonmajors.

### 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**

### 360 Methods and Instruments in Oceanography (3) Sp

The oceanographic environment: design and maintenance requirements for shipboard and for overside equipment. Modern sensing techniques and sampling considerations, the funda-mentals of popular telemetry and recording methods; navigation. Calibration and stability of instruments; the effects of pressure and soft water; unattended instrument platforms. Prerequisite, 402 or 418.

### OCEAN

380H Upper-Division Tutorial-Honors (6) S Research under faculty supervision. Prerequi-sites, junior standing in College of Arts and Sciences Honors Program and permission.

### **OCEAN**

388 Oceanography for Science Teachers (5) S Survey of marine science for secondary school teachers. Emphasis on material that can be adapted for use in the high school. Prerequisites, 20 credits in natural sciences and permission.

### **OCEAN**

### 401, 402 **General Physical Oceanography I, II** (5,5) 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, Mathematics 126; 401 for 402.

### OCEAN

405 General Geological Oceanography (5) Sp Shorelines and nearshore sedimentation; structure and morphology of the continental terrace and deep-sea floor; sediment types and distribution; marine geological methods and applications. Not open to majors in geological oceanography. Prerequisites, 402 or 419, which may

be taken concurrently, and Geological Sciences 205.

### OCEAN

### 415 Fundamentals of Underwater Acoustics (3) A -

Vibrating strings, bars, and membranes; plane and spherical acoustic waves; transmission and reflection at boundaries. Prerequisites, 402 or 418, Mathematics 126 or 136H, or permission.

### **OCEAN**

## 416 Applications of Underwater Acoustics (2) W

Transducers and arrays, absorption and refraction in seawater, sound channels and bottom effects, ambient noise, scattering, passive and active tracking, acoustic telemetering. Prerequisite, 415.

### OCEAN

### 417, 418 Physical Oceanography I, II (5.5) A,W

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; Mathematics 427, which may be taken concur-rently, Physics 223, Chemistry 160, or permis-sion; for 418: 417 and Mathematics 428, which may be taken concurrently.

### OCEAN

### 419 Ocean Tides and Waves (5) Sp

Theory of surface waves; wave forecasting, transformation of waves in shallow water, wave forces. 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 (2) Sp

Physical-chemical aspects of high-ionicstrength solutions as related to seawater, kinetics, thermodynamics, and heterogenous equilibria are included. Prerequisites, 421 and Chemistry 350, 351, or permission.

### OCEAN

### 423, 424 Chemical Oceanography Laboratory (2,2) AWSp,W

Laboratory problems in the analytical and physical chemistry of seawater and marine materials. Prerequisites, for 423: 421, Chemistry 221; for 424: 422 and 423; 423 and 424 may be taken concurrently with 421 and 422, respectively.

### **OCEAN**

### **Biological Oceanography: Organisms and** 433 Processes (3) Sp

Marine organisms with emphasis on bacteria, the microscopic plants, the protozoa, and smaller animals; biological processes affecting the sea. Recommended for nonbiologists. Prerequisites, 401 or 417 and Biology 101-102, or permission.

### OCEAN

### 434 **Biological Oceanography: Organisms and** Environments (3) W

Organisms of the plankton, nekton, and benthos; their adaptations to ocean environments and their relationships to each other. Prerequi-sites, 401 or 417, and 20 credits in biological sciences, or permission.

### OCEAN

### 435 Biological Oceanography: Quantitative Aspects (3) Sp

Ouantitative distribution in time and space of pelagic and bottom organisms in the open ocean and on the shelf; rates of processes. Pre-requisite, 433 or 434, or permission.

### **OCEAN**

### 443 Regional Oceanography (3) Sp

Application of modern methods to the comprehensive description of selected areas of the oceans. Prerequisite, advanced senior standing.

### OCEAN

## 444 Design and Analysis of Oceanographic

Experiments (3) A Planning of field and laboratory experiments in oceanography; evaluation and processing of oceanographic data. Prerequisite, Quantitative Science 281 or permission.

## OCEAN 450 Geological Oceanography (5) A

Shore processes; structure and morphology of the continental terrace and deep-sea floor; marine sedimentary deposits and stratigraphy; geological history of ocean basins and seawater. Prerequisites, major in geological oceanography or Geological Sciences 401- or 417 (or concurrent registration), or permission.

### **OCEAN**

451 Geochemistry of Marine Sediments (2) W Study of chemical aspects of the more abundant minerals in marine sediments; their origin or mode of formation; their isotopic and chemical composition; their rate of deposition; their distribution and relative importance in the major sedimentary cycle; their influence on the chemical composition of seawater. Prerequisite, one year of general chemistry.

### OCEAN ·

### 452 Physical Sedimentology (3) Sp

Introduction to theoretical and experimental techniques used in studying erosion, transportation, and deposition of sediment. Analysis of sediment samples, initial motion of sediments, bed-load motion, suspension of sediment by turbulent flows, erosion and deposition of sediment by turbulent flows, mass movement of sediments, and applications of sediment transport theory to problems of geological interest. Prerequisite, 402 or permission.

### OCEAN

### 453 Sedimentary History of the Ocean 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

Ecology and systematics of plant and animal groups contributing to neogene marine sediments. Emphasis on microfossils. Prerequisites, 433 or 434, and 435, 450 or Geological Sciences 321 or 430, or permission.

### OCEAN

### 455 Biogenic Sediments II (3) W

Survey of silicate micro-organisms and microfossils with emphasis on their geological and geographical occurrences and their application to deep-sea stratigraphy. Prerequisite, 454 or permission.

### **OCEAN**

456 Acoustic and Seismic Techniques (2) W Acoustic data-taking techniques; analysis and interpretation of acoustic bathymetry and seismic reflection and refraction data. Prerequisite, 415 or permission.

### **OCEAN**

### 457 Marine Sedimentation (3) Sp

Origin, transportation, and deposition of marine sediments; marine sedimentary environments; physical aspects of marine sedimentary processes. Prerequisite, 402 or permission.

### OCEAN

### 458 Chemical Aspects of Marine Sediments (3) W

Survey of minerals in marine sediments: their origin or mode of formation, their isotopic and chemical composition, their rate of deposition, their chemical alteration after deposition, their distribution and relative importance in the major sedimentary cycle. Prerequisite, Chemistry 160.

### OCEAN

### 460 Field Experience in Oceanography (1-6, max. 6) AWSpS

Work ashore and on research vessels; design of experiments; cruise planning; chemical, physical, biological, geological, and geophysical analyses; preparation of reports. One or more cruises may be required. Prerequisite, permission.

### **OCEAN**

### 462 Applications of Oceanography (2) W

Analysis of special cases involving application of oceanography to practical problems. Prerequisite, a physical or biological science major or permission.

### OCEAN

### 471, 472 Scientific Perspectives on the Marine Environment (2,2) A,W

Descriptions of marine environments and the regional and seasonal variations in their characteristics. Scientific principles and the magnitude of natural processes. Constraints imposed by the environments upon technology and social management. Offered jointly with the Institute for Marine Studies as Institute for Marine Studies 471, 472. Prerequisites, permission for 471; 471 for 472.

### OCEAN

### 480H Undergraduate Research—Honors (6) S

Independent research. Prerequisites, 180H or 380H, and permission.

### OCEAN

### 485 Topics in Oceanography (2) A

Series of weekly lectures on oceanographic topics, including physical and chemical properties of water, motions, life in the sea, geological features, data collection and analysis, etc. For nonmajors. Prerequisite, upper-division standing in science.

### OCEAN

488H Field Experience—Honors (2-6, max. 6) AWSp

Participation in extended oceanographic field

operations on a research vessel; data analysis and reduction, report preparation. Prerequisites, 380H or 480H; and permission.

### OCEAN

489H Undergraduate Thesis—Honors (1-6, max. 6) AWSp

Theoretical or experimental contribution to oceanography. Prerequisites, 480H and permission.

### OCEAN

499 Undergraduate Research (1-12, max. 24) AWSp

Research on assigned topics that may involve laboratory work, field work, or literature surveys. Prerequisite, permission.

### **Courses for Graduates Only**

### **OCEAN**

### 505 Current Problems in Geological Oceanography (1)

Discussion of research topics that are currently being investigated within the department. Prerequisite, permission.

### 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 only in even-numbered years.)

### **OCEAN**

516 Ocean Circulation (2) W

Hydrodynamic theories concerning origin and characteristics of major ocean currents. Prerequisite, 513. (Offered only in even-numbered years.)

### OCEAN

### **517** Oceanography of Inshore Waters (5) Sp Theories and techniques of 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 only in odd-numbered years.)

### OCEAN

### 518 Seminar on Dynamical Oceanography . (1, max. 9) AWSp

Selected problems of current importance concerning the dynamics of the ocean. Concentrates on those topics that are considered fundamental, of central importance to most of the areas of applications.

### OCEAN

### 519 Interaction of the Sea and Atmosphere (5) Sp

Interchange of heat, water, and energy; study of budgets and of mechanisms of exchange. Prerequisites, 418, Atmospheric Sciences 462. (Offered only in even-numbered years.)

### OCEAN

### 520 Seminar (0) AWSp

### **OCEAN**

### 521 Seminar on Chemical Oceanography (\*, max. 9) AWSp)

Lectures, discussions, and readings on selected problems of current interest. Prerequisite, permission.

### **OCEAN**

### 523 Advanced Problems in Chemical

Oceanography (1-4, max. 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, Chemistry 455, 456, 457, 460, or permission.

### OCEAN

### 525 Marine Chemical Dynamics (3) A

Application of reaction rate theory to the study of chemical processes not at equilibrium in the oceans. Nonequilibrium conditions in natural waters, transient states, basic kinetic theory, reaction rates at the air-sea and sediment-water interfaces, uptake and cycling rates of chemical species by biological systems. Prerequisites, 421, 422, Chemistry 455, 456, 457, 460, or similar background.

### **OCEAN**

### 530 Marine Primary Productivity (3) Sp General concepts of marine phytoplankton production; laboratory and field studies; critical examination of special problems. Not open to students who have taken 534. Prerequisites, 433 or 434, and 435, and permission.

### **OCEAN**

### 531 Seminar in Biological Oceanography (\*, max. 9) AWSp

Lectures, discussions, and work on selected problems of current interest. Prerequisite, permission.

### OCEAN

### 532 Marine Microbiology (1-4) Sp

Ecology and biochemistry of marine bacteria. Prerequisites, Microbiology 400 and permission.

### **OCEAN**

### 533 Zooplankton Ecology (3 or 6) S

Identification of plankton animals; evaluation of sampling methods; rate measurements on selected species; work on ecological problems. Prerequisite, permission. (Offered for 6 credits only in even-numbered years at Friday Harbor Laboratories.)

### OCEAN

### 534 Phytoplankton Ecology (6) S

Contemporary problems in marine phytoplankton investigations. Evaluation of methods used in field and laboratory studies. Prerequisite, permission. (Offered only in even-numbered years at Friday Harbor Laboratories.)

### 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 interrelation-ships 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

### Identification and Structure of Marine 538

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 Geometronics (1-3) AWSp Lectures and discussions on selected problems in the applications of statistics in earth science. Prerequisite, Quantitative Science 383.

### **OCEAN**

544 Statistical Models in Oceanography (3) W Multivariate analysis: regression, trend surface analysis, factor analysis, discriminant functions, and stochastic process models in oceanography. Prerequisite, Quantitative Science 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**

### **Research Techniques in Marine** 553 Geochemistry (2)

Analytical techniques and instruments applicable to problems of marine geochemistry. Prerequisite, Chemistry 351.

### OCEAN

### 554 Research Techniques in Marine Geology (3) A

Planning field programs; selection of equipment and survey procedures; collection, analysis, compilation, and presentation of bathymetric and sediment data; evaluation of techniques and results. Prerequisites, 450, 453 or 551, which may be taken concurrently.

### **OCEAN**

555 Marine Geochemistry (3) Topics in geochemistry of the oceans and marine sediments. Prerequisites, Chemistry 351 and permission.

### **OCEAN**

### 556 Advanced Marine Geology (\*, max. 9) AWSp

Contemporary problems in marine geology; concepts supporting or at variance with accepted hypotheses; discussion of recent advances. Prerequisite, permission.

### **OCEAN**

### Fluid Mechanics of Erosion and 560 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 ecosys tems. Prerequisites, Biology 472, FORTRAN, Mathematics 126, Quantitative Science 382, or permission.

### **OCEAN**

### 571 Gravity and Geomagnetic Interpretation (3) A

Fundamental concepts; the earth's magnetic field; instrumentation and reduction of magnetic measurements, interpretation of magnetic data; gravity measurements, reduction of gravity observations; interpretation of gravity anomalies. Offered jointly with the Geophysics Program as Geophysics 571. Prerequisites, Physics 323 or equivalent, Geological Sciences 450, or permission.

### **OCEAN**

### 573 Terrestrial Magnetism (3) Sp

Advanced aspects of earth magnetism intended for specialists in this field. Extensive discussion of origin theories and their implications: physical basis and theories of magnetism in rocks; paleomagnetic techniques and results. Offered jointly with the Geophysics Program as Geophysics 573. Prerequisite, Geophysics 453.

### OCEAN

OCEAN

600 Independent Study or Research (\*) **AWSpS** 

700 Master's Thesis (\*) AWSpS

**OCEAN** 800 Doctoral Dissertation (\*)

### PHILOSOPHY

### **Courses for Undergraduates**

### PHII.

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

### 113 Philosophy and Racial Conflict (5)

Study of some of the intellectual causes of racial conflict. Relations between racial and international conflicts are examined.

### PHIL

### 120 Introduction to Logic (5) 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

### Types of Philosophy (5) 200

Siegler

Introductory philosophy. The content of the course is entirely at the discretion of the instructor.

### PHIL

### 201 Practical Reasoning (3)

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

### 230 Philosophic Issues in World Affairs (2)

Philosophical examination of international political power and of the different ideologies contending on the world stage. Particular at-tention to liberal capitalism, imperialism, fascism, Stalinism, and socialism,

### PHIL.

### 231 Philosophy of Human Rights (2)

Examination of historical and contemporary arguments for and against the existence of human rights.

### PHIL

### 240 Introduction to Ethics (5) Richman

Critical study of some typical views of the basis and presuppositions of morality and of moral knowledge. Custom, theology, human



nature, and happiness as standards of moral judgments. Consideration of such topics as free will and responsibility, ethical relativism, and the problem of evil. (Formerly 215.)

### PHIL

### 250 Introduction to Epistemology (3) Marks, Small

Introduction to some of the problems involved in general philosophical accounts of knowledge or in philosophical accounts of our knowledge of certain kinds of statements (e.g., statements about the external world, a priori statements, statements about the past, statements about other minds).

### PHIL

### 253 Introduction to the Philosophy of Language (5)

Small

Introduction to philosophical theories about the nature of language. Topics include meaning, reference, truth, propositions, relations between language and thought and between language and logic, relation of philosophy of language to linguistics and psychology. Prerequisite, 120 or permission.

### PHIL

### 260 Introduction to Philosophy of Science (3) Clatterbaugh, Crocker

Examination of formal languages, the nature of probability, the problem of induction, and determinism.

### PHII.

### 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,

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

### History of Ancient Philosophy (5) A 320

Clatterbaugh, Cohen The pre-Socratics; Plato and Aristotle; the Stoics, Epicureans, and Skeptics; Plotinus.

### PHIL

### 321 History of Medieval Philosophy (5) Boler

Development of main lines of philosophical thought in the Latin West from 400 to 1400, with emphasis on Augustine, Anselm, Abelard, Aquinas, and 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

Survey of the main problems in philosophical analysis from the English Realist reaction against Idealism to the present.

### PHIL

332 History of Modern Political Philosophy (5) Burke.

Examination of major political philosophies from the sixteenth century to the nineteenth century, with attention to the philosophical methods and foundations underlying the theories.

### PHIL.

### 334 Philosophy of Marxism (3) Burke, Crocker

Study of the philosophy of Marx and the Marxist tradition with attention to the philosophical method and foundation of Marxism.

### PHIL

### 340 History of Ancient Ethics (3) W Richman

Development of moral thought from Socrates through the Stoics. Particular emphasis on the ethical writings of Plato and Aristotle. Prerequisite, one previous course in philosophy.

### PHIL

342 History of Modern Ethics (3) Sp Richman

Development of moral thought from Hobbes through Nietzsche, with particular emphasis on the ethical writings of Hume, Kant, and John Stuart Mill. Prerequisite, one previous course in philosophy.

347 Philosophy in Literature (3) Study of philosophical ideas expressed in works of literature.

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 rela-tionship between mind and body, the self, memory, the unconscious, introspection, and knowledge of other minds. Prerequisite, one previous philosophy course.

### PHIL

### 370 Intermediate Logic (5) A

Keyt, Kirk 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)

Siegler 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

### 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, Keyt

Reading of selected middle and late dialogues. Prerequisite, 320 or permission.

### PHIL

### 433 Philosophy of Aristotle (3) Cohen, Keyt

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)

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) 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 the Department of Linguistics as Linguistics 443. Prerequisite, permission.

### PHIL

### 445 Philosophy of Art (5)

Critical examination of characteristic accounts of the nature of art, artistic activity, the esthetic experience, and the artist and his art in relation to society. The philosophy of criticism, the role of the critic, and problems in interpretation and evaluation of works of art.

### PHIL

446 Development of Aesthetic Theory (5) Historical development of esthetics, 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 of society.

### PHIL

450 Epistemology (3)

Kirk, 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

Examination of issues and problems that arise in connection with such topics as freedom of the will, the nature of persons and personal identity, the existence of God, and universals. The emphases of the course vary from year to year.

### PHIL

### 458 Phenomenology (5)

Burke The contribution of phenomenology to selected topics in the theory of meaning, philosophy of mind, ontology, and epistemology.

### PHIL

460 Philosophy of Science (5)

Clatterbaugh, Crocker Critical study of different theories about the nature of 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 fluctionalist theories. Prerequisite, 363 or permission.

### PHIL

### 464 Philosophical Psychology (3)

Philosophic analysis of relations between mental events and their expression, especially their linguistic expression. Prerequisite, 100 or 326 or 463.

### PHIL

### 465 Philosophy of History (5)

Analyses of basic concepts employed in historical interpretation, and some of the principal philosophers of history such as Plato, St. Augustine, Hegel, Marx, Spengler, Toynbee.

### PHIL

### 466 Philosophy of the Social Sciences (3) Crocker

Examination of fundamental issues in the methodology and the interpretation of the social sciences. Particular emphasis on value orientation and objectivity, functionalism, reductionism, and the status of idealized models. Prerequisite, 120 or 260 or 460, or course beyond introductory level in a social science.

### PHIL

### 467 Philosophy of Religion (5) Dietrichson

Critical examination of three approaches to religion: reason, intuition, and faith. Prerequisite, one history of philosophy course or 267, or permission.

### PHIL

### 469 Existentialist Philosophy (3)

Dietrichson

Critical examination of major ideas in Kierkegaard's philosophy and in Sartre's or Heidegger's philosophy. Prerequisite, 322 or 325 or 326, or permission.

### PHIL

### 470 Advanced Logic (5) W

Keyt

An 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 on Legal Philosophy (3, max. 12) Siegler

### PHIL

520 Seminar on Aucient Philosophy (3, max. 12) Cohen, Keyt

### PHIL

521 Seminar on Medieval Philosophy (3, max. 12) Boler

### PHIL

522 Seminar on Modern Philosophy (3, max. 12) Clatterbaugh

### PHIL

526 Seminar on Recent Philosophy (3, max. 12) Keyt, Marks

### PHIL.

540 Seminar on Ethics (3, max. 12) Keyt, Richman

### PHIL

545 Seminar on the Philosophy of Art (3, max. 12)

### PHIL

550 Seminar on Epistemology (3, max. 12) Crocker

### PHIL

556 Seminar on Metaphysics (3, max. 12) Coburn

### PHIL

 563 Seminar on the Philosophy of Mind (3, max. 12) Thomas

Prerequisites, at least two courses related to philosophy of mind or permission.

### PHIL

565 Seminar on the Philosophy of History (3, max. 12)

### PHIL

 567 Seminar on the Philosophy of Religion (3, max. 12)
 Dietrichson

### PHIL

570 Seminar on Logic (3, max. 12) Kirk

### PHIL

584 Reading in Philosophy (1-4, max. 12) 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 the graduate adviser.

### PHIL

700 Master's Thesis (\*) AWSp

### PHIL

800 Doctoral Dissertation (\*) AWSp

### PHYSICAL AND HEALTH EDUCATION

### **PHYSICAL EDUCATION: DANCE**

### **Courses for Undergraduates**

### PEDNC

278 Intermediate Folk Dance (3) Prerequisite, PE 127 or permission.

### PEDNC

282 Fundamentals of Rhythm (2) Sp Understanding of fundamental rhythm concepts and their application in the development of technique and style in basic dance forms.

### PEDNC

283 Contemporary Dance (2) W Skinner

Understanding of fundamental rhythm concepts and their application in the development of technique and style in contemporary dance forms.

### PEDNC

## 309 The School Dance Program: Secondary (2)

Practice in basic skills in folk, square, and social dancing; methods and opportunity for presentation; source materials; organization of coeducation dance program. Prerequisite, 282.

### PEDNC

### 310 Traditional Dance Forms (3) A

Dance and rhythmic activities appropriate for older children; folk and ethnic dance, American traditional dances, and creative forms of dance.

### PEDNC

311 Rhythmic Activities for Small Children (2) Sp

### Skinner

Activities suited to the kindergarten and primary child. Educational value, significance in child growth and development, and methods of presentation.

### PEDNC

### 355 Dance Composition (2, max. 6) AWSp Skinner

Practice in modern dance; analysis of choreography; creative work. Prerequisite, permission.

### PEDNC

364 History of Dance (3) W Survey of the function and form of dance from primitive culture in its present art form, with emphasis on Western civilization.

### HEALTH EDUCATION

### **Courses for Undergraduates**

H ED

250 Contemporary Health Concepts (2) AWSp

Investigation of contemporary health problems

373

## ARTS AND SCIENCES

and the scientific concepts and the knowledge essential to the comprehension and the solution of these problems within society.

### H ED

### 292 First.Aid (2) AWSpS

Student may meet requirements for both Standard and Advanced American Red Cross First Aid certification.

### H ED

### 330 Safety and Accident Prevention (2)

Pertinent problems and programs in accident prevention. Special consideration is given to home, industrial, institutional, recreational, and transportation safety.

### H ED

### 350 Foundations of Health Behavior (2) WSp

Biosocial influences on the health of the individual, including physical and emotional responses to health and disability. Emphasis is on the health problems of the school and college population. Prerequisite, 250.

### H ED

### 351 - School Health Programs (3) A

Overview of the school health program, including underlying principles and legal responsibilities, with emphasis on health services, health instruction, and healthful school living. Interrelationships with other community health agencies also are considered. Prerequisite, 350.

### H ED

### 352 Health Implications of the School Environment (3) W

Implications for health instruction of school policies, procedures, facilities, and personnel. Prerequisite, 351.

### H ED

### 353 Theory and Practice of Health Education (3) Sp

Cooley

Application of motivation and learning concepts to health education. Prerequisite, 352.

### H ED

### 481 Human Sexuality and Education (3) 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

H ED

H ED

AWSD

(3) Â

equivalent.

Prerequisite, permission.

**Courses for Graduates Only** 

Prerequisites, 453, 465 or permission.

499

### 498 Special Studies in Health Education (2-6, max. 6) AWSp Prerequisite, permission.

Undergraduate Research (3, max. 6)

503 Seminar in Health Education (3, max. 9)

505 Program Development and Evaluation

Emphasis on conceptual models, program de-

terminants, organizational variability, and re-

ciprocal effects of evaluative techniques in

school health education. Prerequisite, 353 or

### H ED

508 Administrative Relationships in the Health Education Program (3) Sp Decision making, management theory, and interagency programs.

H ED

### 590 Research Analysis and Design in School Health Education (3) W

Review and analysis of research pertinent to school health programs. Emphasis is given to research design, procedures, and interpretation. Prerequisite, Biostatistics 472 or EDPSY 490.

H ED

600 Independent Study or Research (\*) AWSpS

### H ED

700 Master's Thesis (\*) AWSpS

### PHYSICAL EDUCATION

### **Courses for Undergraduates**

101 Through 199

Courses designated II, III, or IV carry prerequisites of I, II, or III, respectively, or evidence of proficiency equivalence in that activity; level I courses are for beginners only. Auditors are not allowed to take 100-level courses.

### PE

### 100 Adapted Swimming (1)

For physically limited students who need an individually designed program. Prerequisite, permission.

### PE

101 Aquatic Art (1) Prerequisites, well-coordinated front crawl, back crawl, breaststroke, front dive, and underwater swimming.

### PE

103 Skin Diving (1) Prerequisite, 102 or 108 or equivalent.

### PE

104 Springboard Diving (1) Prerequisites, ability to swim fifty yards and to tread or float for five minutes.

### PE

106, 107, 108, 109 Swimming I, II, III, IV (1,1,1,1)

Level II for students who can swim twenty-five feet but not fifty yards. Level IV prerequisite, ability for fifty yards' crawl and reasonable proficiency on side and back.

PE

110 Swimming V: Intercollegiate (1) Prerequisite, permission.

### PE

112 Water Polo (1) AWSp Prerequisite, 108 or equivalent.

### PE

**114, 115** Canoeing I, II (1,1) Prerequisite, ability to swim fifty yards and to swim, tread, or float for fifteen minutes. Following hour must be free for travel time Rec

## lowing hour must be free for travel time. Fee charged.

11

117 Crew I (1) Prerequisite, 107 or equivalent. PE 119 Crew V: Intercollegiate (1)

Prerequisite, permission.

PE

120 Sailing I (1) Must have hour following class free for travel time. Prerequisite, ability to demonstrate water safety.

PE

PR

123, 124, 125 Contemporary Dance I, II, III (1,1,1)

Concepts and techniques of dance as a modern art form. Prerequisites, 123 for 124; 124 for 125, or permission.

PE 127 International Folk Dance (1)

128 Korean Dance (1)

PE

129 Jazz Dance (1)

130 Social Dance I (1)

**132** Adapted Activities (1) For students with physical problems and disabilities. Prerequisite, permission.

133, 134 Archery I, II (1,1)

136, 137 Badminton I, II (1,1)

139 Baseball V (Men): Intercollegiate (1) Prerequisite, permission.

PE 140 Basketball II (1) Prerequisite, ability to play official basketball.

**142 Basketball V: Intercollegiate (1)** Prerequisite, permission.

PE 143, 144, 145 Bowling I, II, III (1,1,1) Fee charged.

PE 146 Boxing I (Men) (1)

PE 147 Conditioning (1)

PE 148, 149 Fencing I, II (1,1)

PE

150 Field Sports I (1)

PE 152

152 Football V (Men): Intercollegiate (1) Prerequisite, permission.

PE 153 Golf I (1) Following hour must be free for travel time. Fee charged.

**155 Golf V: Intercollegiate (1)** Prerequisite, permission.

### PE

156, 157 Gymnastics I, II (1,1) For women: modern gymnastics floor exercise, balance beam, vaulting, uneven bars, tumbling, and trampoline. For men: floor exercise, pommel horse, rings, vaulting, parallel bars, horizontal bars, tumbling, and trampoline.

### Ľ

159 Gymnastics V: Intercollegiate (1) Prerequisite, permission.

PE 160 Handball I (1)

PE 163 Judo I (1)

PE 167, 168 Mountain Climbing I, II (1,1) S,S

Fee charged.

169, 170, 171 Riding I Horsemanship, II and III English Saddle (1,1,1) Fee for lessons; insurance recommended.

PE 173, 174 Skating—Ice I, II (1,1) Fee for lessons and skates; insurance recommended.

PE 175 Ski Conditioning (1)

PE 176, 177, 178 Skiing I, II, III (1,1,1) Fee for lessons and transportation; insurance recommended.

PE 179 Skiing V: Intercollegiate (1) Prerequisite, permission.

PE 180 Soccer (1)

PE 182 Softball II (1) Prerequisite, ability to play official softball.

PE 183 Special Activities (1) Prerequisite, permission.

PE 184 | Squash I (1)

PE 187, 188, 189 Tennis I, II, III (1,1,1)

PE 191 Tennis V: Intercollegiate (1) Prerequisite, permission:

PE 192 Track I (1)

PE 193 Track V: Intercollegiate (1) Prerequisite, permission.

PE 194 Volleyball I (1)

PE 195 Volleyhall V: Intercollegiate (1) Prerequisite, permission.

PE 196 Weight Training (1)

PE 198 Wrestling I (Men) (1)

PE 199 Wresting V (Men): Intercollegiate (1) Prerequisite, permission.

### 201 Meaning and Modification of Movement (2)

Assessment and interpretation of personal movement skill and activity preference. Course designed for nonmajors.

### PE

### 203 **Effort Management and Stress Reduction** (3) AWSp Woods

Recognition and management of residual muscular tension through relaxation; theories, implications, techniques, laboratory, and discussion.

### PR

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

### Basic Biomechanics for Nursing (2) 205 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, Conjoint (Medicine) 316.

### PE

### 210 **Performance Precisions and Choreographic Principles in Gymnastics** (2, max. 4) Sp

Techniques beyond the introductory level, with optional emphasis on floor exercise or apparatus. Prerequisite, 157 or permission.

### PE

### 216 Scuba Diving (2) 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.

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

230 Power Volleyball (2) Performance and analysis of advanced skills and strategies. Prerequisite, 194 or permission

### PE

### 250 Introduction to Movement Analysis (4) AWSD

Lawson, Waltz

Exemplary topics in the study of human movement, including behavioral, experiential, and interpretive perspectives.

### Field Sports (2) A 271 Renick

Strategy, interaction, and movement effective-ness in field sports.

### PE

290 Officiating (2) ASp Techniques of officiating for men: football,

basketball, track and field, swimming, tennis, volleyball, softball, and speedball.

294 Life Saving (2) AWSp Prerequisite, ability to swim 440 yards (American Red Cross certification possible).

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.

### 301 Socialization of Movement Activities (4) AW

Landers

Processes of social influence and their relationship to an individual's movement and sport performance. Socialization via sport and socialization into sport roles. Prerequisites, Psychology 100 and Sociology 110. (Last time offered: Winter Quarter 1977.)

### 302 Movement Activities in Society and Culture (4) ASp

Play, dance, games, and sports with reference to groups, roles, values, and interaction. Pre-requisite, Sociology 110. (Last time offered: Winter Quarter 1977.)

**304** Officiating (2, max. 4) AWSp Techniques of officiating, opportunity for women's national and local ratings.

### PE

### 312 Physical Fitness Activities for Children (21/2) 8

Movement activity that contributes to physical fitness and motor efficiency; performance stan-dards as related to physical growth and development levels; criteria and techniques for evaluation of physical performance of children.

### Movement Exploration for Children (3) 314

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) W

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) Sp Critical analysis of conditioning techniques and programs, considering elements of fitness, biomechanical principles of exercise, and specificity of movement performance requirements. Prerequisite, 332.

### PR

325 Growth and Motor Development (4) AWSp Smoll

Factors influencing the physical growth and the development of movement skills during infancy, childhood, and adolescence. Interrelationships of motor and other aspects of development.

### PE

331, 332 Human Kineoenergetics (5,5) AW,WSp

Doolittle, Hutton, Miller

Maturational and functional explanations of

375

human movement potential; interaction among structural patterning, mechanisms, regulatory processes, and external physical forces; reciprocal effects of moving and potential for move-ment. Prerequisites, for 331: 250, Zoology 118, 119 or 208, Biological Structure 301; 331 for 332.

### PE

336 Athletic Training and Conditioning (2) W Prerequisite, Health Education 292 or permission.

### 340 Administration of Intramural Sports (3)

### PR

### 350 Learning and Movement Performance (5) AWSD Purdy

Interrelationships among perceptual mecha-nisms, individual characteristics and tasks, organizational and situational variables as related to the learning of movement skills. Pre-requisite, Psychology 100.

### PE

### 359 Workshop in Gymnastics (3) S Hughes

Lectures, practice, and supervised teaching in gymnastics. Prerequisite, permission.

### PE

### 365 Applied Movement Learning (4) AWSp Fox. Peek

Relationships among goals, content, and process in the teaching of movement skills. Prerequisite, 350.

### PE

### 366 Practicum (1, max. 3) AWSp Fox, Hughes, Renick

Prerequisites, 365 and permission.

### PD

### 368 Analysis of Movement Performance (3, max. 12) AWSp

Analysis of efficient and effective movement performance patterns within specific performance contexts.

### PE

Coaching of Football (2) Sp 370

### PE

371 Coaching of Basketball (2) A

### PE

PE

Coaching of Track and Field (2) W 372

### Coaching of Baseball (2) Sp 373

PE

### 410 Social Correlates of Movement Forms and Patterns (3) ASp

Play, dance, games, and sports with reference to groups, roles, values, and interaction. Prerequi-sites, 250 and Sociology 110.

### PE

### 412 Sport in the United States (3) W **Morford**

Relations of sport to American culture, with emphasis on issues, problems, and trends.

PE

### Athletics in the Ancient World (3) A 413 Morford

Role and significance of games and physical activities in ancient societies, with special emphasis on Greek athletics and Roman spectacles.

### PR

### 414 Rise of Sport (3) Sp Morford

Study from the historical perspectives of the interrelationship of sport and culture from the age of chivalry to the age of international Olympianism.

### PE

### 420 Movement Development Analysis (3) A Small

Interrelationships among physical growth, motor development, and psychosocial development of children; includes laboratory experience in observing, analyzing, and interpreting behavior of children. Prerequisite, 325.

### PE

### 434 **Exercise and Cardiopulmonary** Irregularities (3) 8

Doolittle, Hutton

Problems, limitations, and benefits of exercise in the alleviation of cardiopulmonary handicaps, with particular attention to the middleaged population. Prerequisite, 331 or human anatomy, physiology, and physiology of exer-cise, or permission.

### PE

### Adapted Activities (3) Sp 436 Woods

Study of activities suited to the interests, capacities, and limitations of students with handi-caps. Prerequisite, 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 Peek

Problems of organization and conduct. Prerequisites, 365 and 460.

### PE

### 455 **Measurement and Evaluation in Physical** Education (4) AW

For

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 Traditional views of physical education exammined with reference to research findings and dynamics of program change. Prerequisites, 250, 301, 302, 325, 332, 350.

### PE

### 470 Social Psychology of Sport and Human Movement (4) Sp Landers

The relationship between selected social processes and sport and human movement experiences, including social structure and process as it affects sport, or as it is, in turn, affected by sport and human movement experiences: Prerequisites, 301, 302, or permis-sion. (Last time offered: Winter Quarter 1977.)

### PE 478

### **Programs in Elementary Physical** Education (3) SpS

Progress and problems in modern programs. Offered jointly with the College of Education as EDC&I 425. Prerequisites, 314, 316, EDC&I 324

### PR.

### 480 **Biomechanics (3)** A Miller

Experimentation with the integration of the physical laws of the universe and the structure and function of the human body with the requirements of various movement tasks. Prerequisite, 332 or permission.

### PE

### **Philosophical Perspectives of Human** 485 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.

### 490 **Contemporary Perspectives in the Study** of Human Movement (3) A Waltz

Consideration of ways in which inquiry in the arts and sciences of human movement can be approached. Prerequisite, senior standing or permission.

### PE

### 493 **Problems in Athletics (3) WSp** Landers, Morford

Place of interschool athletics in education. Control, finance, eligibility, safety measures, publicity, and public relations. Qualifications and duties of coaches, managers, and officials. Prerequisites, 450 and 460.

### 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

Lawson

Issues, problems, and trends in physical education and other movement-centered programs: relationship of changes in direction or focus to emergent knowledge; social, political, or other factors. Prerequisite, graduate student standing in physical education or permission.

### 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 (21/2) 8

Functions, supervisory organization, evaluation, workshops, in-service education, applica-tion of democratic leadership to specific program and personnel problems. Prerequisites, 450 and 460, or permission.

### PE

### The Structure and Strategies of Sports 510 and Games (4) WSp

Definitions, classification systems, characteristics, and theories of games and sports; particular emphasis on structural and strategical theories in lieu of social, psychological, and cultural theories.

### PE

### 520 **Advanced Growth and Motor** Development (3) W Smoll

Studies in movement development, focused on analysis of physical growth, motor develop-ment, and interrelationships among modifying variables. Designed to prepare students for research in developmental aspects of motor performance. Prerequisite, 325 or permission.

### PE

### **Physiological Bases of Physical** 540 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.

### 552 Neural Control Systems of Movement (3) 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

### Neurophysiological and Behavioral Correlates of Movement (3) Sp 553 Hutton

Cross-disciplinary approach to selected topics pertinent to the study of movement behavior (e.g., volitional movement, visuomotor interrelations and perception, drugs and motor performance, proprioceptions, and feedback). Pre-requisites, 332, 552, Zoology 118 or 208, or permission.

### PR

### 562 **Advanced Learning and Movement** Performance (3) Sp Purdv

Interrelationships among situational and conditional variables as related to learning and performance of movement skills, emphasis on practice factors. Prerequisite, 350 or permis--sion.

### PE

### 590 Research in Human Movement (3) AW Research procedures appropriate to the solution of human movement problems. Prerequisite, statistics or permission.

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 perfor-mance, sociocultural correlates of movement, movement experience, and esthetics. No more than 3 credits in any one area. Prerequisites, 590 and permission.

### PE

### Independent Study or Research (\*) 600 AWSpS

PE

### 700 Master's Thesis (\*) AWSpS

### **RECREATION PLANNING AND** ADMINISTRATION

### **Courses for Undergraduates**

### RECPL

314 Introduction to Community Recreation (5) Hovis

Historical and analytical overview of organized recreation; emphasis on community recreation services provided by public, private, voluntary, and commercial agencies; comparison evaluation and coordination of these services. Prerequisites, Sociology 110, Psychology 100, or permission.

### RECPL

## 324 The Recreation Program (5)

Examination of a broad spectrum of recreation program activities, techniques, and materials through lectures, discussion, and participation. Includes laboratory experience. Prerequisite, 314.

### RECPL

334 Conduct of Recreation (2) Leadership in operation of areas and facilities. Duties and responsibilities, personnel regulations. Motivating and conducting a diversified program. Prerequisite, 324.

### RECPL

### **Organization and Administration of** 344 Camp Programs (3)

The educational and social significance of camping; organization of activities and problems of administration. Prerequisite, 314.

### RECPL

### 354 Recreation Practicum (3)

Directed experience in recreational activities and program services for the enhancement of leadership techniques. Prerequisites, 314 and permission.

### RECPI.

384 Camp Counseling (3) S Hughes

On-the-job experience in camp counseling. Students are quartered at Camp Waskowitz, act in the capacity of camp counselors for select groups, and assist in the direction of evening and Sunday educational and social activities.

### RECPL

### 434 Administration of Recreation (5)

Practices and procedures in management and operation of areas and facilities. Duties and responsibilities, personnel regulations, and staff organization. Motivating and conducting a diversified program. Prerequisite, senior standing.

### RECPL

### 454 Recreation Internship (6)

On-the-job experience under agency executives

and their supervisors for experiences in all. phases of administration and supervision. Prerequisites, senior standing and permission.

### **Courses for Graduates Only**

### RECPL

504 Public Recreation (3) Legal basis and responsibilities; internal organization; financial support and budgeting. Acquisition, construction, development, maintenance, and operation of areas and facilities. Personnel selection and management.

### RECPL

### Seminar on Community Resources for 524 **Recreation (3)**

Functional analysis of integrated community recreation services. Experience in recreation fact finding, analysis, and evaluation. Study of pertinent problems and needs in the field.

### RECPL

600 Independent Study or Research (\*)

RECPL

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 natural 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, which may be taken concurrently. 118: heat and electromagnetism laboratory. Prerequisite, 115, which may be taken concurrently. 119: light and modern physics lab-oratory. Prerequisite, 116, which may be taken concurrently.

The courses 121, 122, 123, 131, 132, 133, 221, and 222 taken together make up the general physics sequence for science and engineering students.

### ARTS AND SCIENCES

### PHYS

### 121 Mechanics (4) AWSpS

Basic principles of mechanics. Prerequisites, one year of high school physics or permission, concurrent or previous Mathematics 124 or 134.

### PHYS

### 122 Electromagnetism and Oscillatory Motion (4) AWSpS

Basic principles of electromagnetism, the mechanics of oscillatory motion. Prerequisites, 121, concurrent or previous Mathematics 125 or 135.

### PHYS

### 123 Waves (4) AWSpS

Electromagnetic waves, optics, and waves in matter. Prerequisites, 122, concurrent or pre-vious Mathematics 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 and 131 for 132; 122 and 132 for 133.

### 207 The Physics of Music (3)

The nature of sound; vibrations; traveling and standing waves; response of the ear to sound; production of musical sounds.

### PHYS

### 210, 211, 212 Intermediate Physics for **Teachers and Students in Liberal Arts**

(5,5,5) A,W,Sp Individualized self-paced study of wave phenomena, light, electromagnetism, atomic physics, structure of matter and selected topics in relativity, nuclear phenomena, and quantum physics, depending on the background and preparation of the student. Not open for credit to students who have completed courses in the 121 sequence or higher. Prerequisites, at least two quarters of physics such as 101-102; 110, 111; or 114, 115.

### PHYS

### 221 Quantum Physics (3) AWSpS

Introduction to the physics of atoms, molecules, and nuclei; elementary quantum physics. Prerequisites, 123, concurrent or previous Mathematics 126 or 136.

### PHYS

### 222 Statistical Physics (3) WSpS

Heat, thermodynamics, and the statistical de-scription of matter. Prerequisites, 221, which may be taken concurrently, and Mathematics 126 or 136.

### PHYS

223 Elementary Mathematical Physics (3) SpS Applications of mathematics to physics, particularly as illustrated by classical mechanics. Prerequisites, 123 and Mathematics 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, Mathematics 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, Mathematics 328, which may be taken concurrently, for 321; 321 for 322; 322 for 323.

### PHYS

### 324, 325 Quantum Mechanics (3,3) A,W

Introduction to nonrelativistic quantum mechanics. Prerequisites, 221, Mathematics 327 for 324; 324 for 325. Mathematics 205 or 302 recommended.

### PHYS

327 Introduction to Nuclear Physics (3) WS Nuclear structure including nuclear reactions, fission, particle accelerators, and nuclear instrumentation; applications of nuclear phenomena in atomic 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, which may be taken concurrently.

### PHYS

### 400 Basic and Modern Physics (11) S

Review of the fundamental and modern developments in physics with suggestions for lecture demonstration and laboratory. Primarily for Summer Institute students. Prerequisite, permission.

### PHYS

401, 402, 403; 401H, 402H, 403H Special Problems (\*,\*,\*) A,W,Sp;S Supervised individual study. Prerequisite, per-

Supervised individual study. Prerequisite, permission.

### PHYS

### 407, 408, 409 Physics for Teachers (5,5,5) A,W,Sp

Basic physics, providing background and perspectives needed for teaching new elementary science materials such as AAAS, ESS, SCIS, etc. Intended for in-service elementary teachers or graduate students preparing for elementary (or secondary nonscience) teaching. Not applicable as credit toward a physics degree. Prerequisite, permission.

### PHYS

**421** Atomic and Molecular Physics (3) A Survey of the principal phenomena of atomic and molecular physics. Prerequisites, 323 and 325, or permission.

## PHYS

### 422 Nuclear and Elementary Particle Physics (3) W

Survey of the principal phenomena of nuclear and elementary particle physics. Not open for credit to students who have completed 327. Prerequisites, 323 and 325, or permission.

### PHYS

### 423 Solid State Physics (3) Sp

Survey of the principal phenomena of solid state physics. Prerequisites, 323 and 325, or permission.

### PHYS

### 424, 425, 426 Mathematical Physics (3,3,3) A,W,Sp

424: advanced classical mechanics. 425, 426: mathematical techniques of particular use in physics, including partial differential equations. Prerequisites, 323 and 325, or permission for 425; 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. Prerequisites, 30 credits in physics or permission. 433: techniques in nuclear and elementary particle research. Prerequisite, 327 or 422, or permission.

### PHYS

440 Basic Concepts of Physical Science (3) Deals with the nature and origin of some of the basic concepts of the physical sciences. Not open to science or engineering majors. Prerequisite, junior standing.

### 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 applied mathematics, including variational, principles, Lagrange's equations, Hamilton's equations, and canonical transformations.

### PHYS

### 513, 514, 515 Electromagnetism and Relativity (4,4,4) A,W,Sp

Properties of electric and magnetic fields in free space and material media; boundary-value problems; radiation from accelerated charges and electromagnetic waves; the theory of special relativity leading to a relativistic formulation of electromagnetism and particle dynamics.

### PHYS

### 517, 518, 519 Quantum Mechanics (4,4,4) A,W,Sp

Physical and historical basis for quantum theory; solutions o the Schrödinger wave equation for discrete and continuous energy eigenvalues; representation of physical variables as operators and matrix formulation of quantum mechanics; theory of angular momentum; identical particles; elementary collision theory; various approximation methods for solution of the Schrödinger equation.

### PHYS

### 520 Seminar in Physics, History, and Society (\*) Sp

Lectures and discussions on subjects of interest in physics that are not included in conventional courses. Emphasis is on relationships between physics and other disciplines and activities. Prerequisite, graduate standing or permission.

### PHYS

### 524, 525 Thermodynamics and Statistical Mechanics (3,3) A,W

Statistical mechanical basis for the fundamental thermodynamical laws and concepts; applications of thermodynamic reasoning to selected physical problems; classical statistical distribution functions; quantum statistical mechanics; introduction to equilibrium many-body problems. Prerequisite, 517, which may be taken concurrently.

### PHYS

### 527, 528, 529 Current Problems in Physics (1,1,1) A,W,Sp

Introduction to current research topics for beginning graduate students.

### PHYS

530 Physics Colloquium (\*) AWSp Prerequisite, permission.

### PHYS

531 Seminar on High Energy Physics (\*) AWSp

### Prerequisite, permission.

### PHYS

532 Seminar on Atomic Collisions and Spectroscopy (\*) AWSp Prerequisite, permission.

### PHYS

533 Seminar on Relativistic Astrophysics (\*) Prerequisite, permission.

### PHYS

534 Seminar on Magnetic Resonance and Solld State Physics (\*) AWSp Prerequisite, permission.

### PHYS

535 Seminar on Nuclear Physics (\*) AWSp Prerequisite, permission.

### PHYS

536 Seminar on Low Temperature and Solid State Physics (\*) AWSp

Prerequisite, permission.

### PHYS

537 Seminar on Theoretical Physics (\*) AWSp

Prerequisite, permission.

### PHYS

538 Seminar on Cosmic Ray Physics (\*) AWSp

Prerequisite, permission.

### PHYS

539 Seminar on Problems of Physics Education (\*) AWSp Prerequisite, permission.

### PHYS

541 Survey of Elementary Particle Physics (3) Survey of topics in elementary particle physics. Intended for the nonspecialist having a background of quantum mechanics. Prerequisite, 519.

### PHYS

### 542 Survey of Nuclear Physics (3)

Survey of topics in nuclear physics. Intended for the nonspecialist having a background of quantum mechanics. Prerequisite, 519.

### PHYS

543 Atomic and Molecular Physics Survey (3) Survey of topics in atomic and molecular physics. Intended for the nonspecialist having a background of quantum mechanics. Prerequisite, 519.

### PHYS

### 544 Solid State Physics Survey (3)

A survey of solid state physics. Intended for the nonspecialist having a background of quantum mechanics. Prerequisite, 519.

### PHYS

## 550, 551 Atomic Physics (3,3)

Theory of atomic structure and spectra; atomic and molecular beams; resonance techniques; atomic collisions; topics of current interest. Prerequisites, 519; 550 for 551.

### 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; phenomenonology 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.Sp

A three-quarter course covering the fundamentals of solid state physics. Various topics in solid state physics are covered in considerable detail, bringing knowledge up to the current literature. Prerequisite, 519.

### PHYS

570, 571 Quantum Fleid Theory (3,3) Emphasis varies in different years between rela-

tivistic quantum field theory and the manybody problem. Prerequisite, 566.

### PHYS

## 576 Selected Topics in Experimental Physics

Prerequisite, permission.

### PHYS

### 578 Selected Topics in Theoretical Physics (\*)

Prerequisite, permission.

### PHYS

mission.

600 Independent Study or Research (\*) Study or research under the supervision of individual faculty members. Prerequisite, per-

### PHYS

800 Doctoral Dissertation (\*) Prerequisite, permission of Supervisory Committee Chairman.

### **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. Primarily for prospective majors.

### POL S

### 102 American Government and 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. Primarily for nonmajors.

### POL S

### 203 Introduction to International Relations (5) AWSp

Analysis of the world community, its politics, and government.

### POL S

### 204 Introduction to Political Science (5) AWSp

Survey of the four major subfields of political science (political philosophy, comparative politics, international relations, American politics), each presented by faculty specializing in that area; accompanied by a comprehensive overview of the discipline as a whole. Primarily for prospective majors. Political Science 101, 201, or 202 recommended.

### POL S

### 205 Preparatory Seminar in Political Analysis (5, max. 10) 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.

### **POLS**

313 Women and Patriarchal Politics (5) Sp Analysis of political theory, historical and contemporary, including writings of the women's liberation movement on the political role of women in society. Emphasis is on empirical studies of the "apolitical" woman, and on the process of political socialization in various cultural 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 on Politics (5, max. 10) Intensive reading and research in selected problems or fields of political analysis. Prerequisite, permission.

POL S

### 499 Individual Conference and Research (2-5, max. 10) 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, Lamare, Meranto

Classroom analysis of political theory and of methods of political research, combined with extensive field research in contemporary problems of government and politics experienced by people of the Seattle community.

### POL S

### 311 Theories of Modern Government (5) 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.

### POLS

### 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 background in history is desirable. Prerequisite, 101, or equivalent.

### POL S

### 412 The Western Tradition of Political Thought: Modern (5) W

Continuation of 411, treating materials from the seventeenth century through the early nineteenth century, Hobbes through Hegel. Prerequisite, 411 or permission.

### POL S

413 Contemporary Political Thought (5) Sp Developments from the eighteenth century to the present as a basis for contemporary philosophies of democracy, communism, and fascism. Prerequisite, 411 or equivalent.

### POL S

414 Chinese Political Thought (5) Sp Theories of the Oriental state as exhibited in the writings of statesmen and philosophers. (Offered alternate years; offered 1975-76.)

### POL S

### The Theory of Political Society (5) A 415 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

### **Economic Approaches to Political** 416 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 the Department of Economics as Economics 452. Prerequisites, Economics 201, 400, or equivalent.

### POLS

418 American Political Thought (5) W Major thinkers and movements from the colonial period to the present.

### POLS

### 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.

### POLS

### 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

The Politics of Criminal Justice (5) A 464 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). Un-derstanding 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 equivalent.

## 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.

### POLS

## 360 The American Constitutional System (3)

Fundamental principles, function, evolution, and unwritten constitution; recent tendencies.

### POLS

### Government and the American Economy 370 (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. Political Science 101 recommended.

### POL S

### 451 The Legislative Process (5) W Bone

Organization and procedure of Congress; state legislative politics; lobbying; legislative roles; the theory and practice of representative government. Prerequisite, 101 or 102 or permission.

### POL S

## 452 Political Processes and Public Opinion (5)

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 courses. Prerequisites, upper-division standing and permission.

### POLS

### 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.

POLS

### Administration in Modern Democracies 473 (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)

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 the College of Architecture and Urban Planning as Urban Planning 460. Political Science 101 or 102 recommended.

### POL S

### 481 Introduction to Large City Government and Politics (5)

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 102 recommended.

### POLS

482 State Government (5) Sp

Focus on the structures, processes, and policy outputs of state governments in the United States.

### POLS

### 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

Lamare, Meranto, Shepro

Advanced undergraduate course in urban politics. Opportunity for more independent and intensive analysis of particular problems or lines of inquiry. Prerequisites, 101 or 102 and 480 or 481.

### POL S

### 487 Intergovernmental Relations (5) W Gore

Analysis of the content and dynamics of the relations between federal, state, and local governments, with emphasis upon patterns in these relationships that reflect program structures.

### **POLS**

490 Analysis of Political Behavior (5) AW Examination of concepts, techniques, and re-sults of research on political behavior.

### POLS

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

495 Psychiatry, Psychology, and Politics (5) Survey of the contributions of psychiatry, psy-choanalysis, and psychology to the understanding and analysis of politics. Background for further work in political psychology and social psychodynamic studies of politics.

### **COMPARATIVE GOVERNMENT AND** INTERNATIONAL RELATIONS

### **POLS**

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) AŜp Riley

Department of State; diplomatic and consular

services; American diplomatic practice and procedure.

### POL S

323 International Relations of the Western Hemisphere (5) W

The Monroe Doctrine; Pan-Americanism; special interests in the Caribbean; hemisphere soli-darity; the "Good Neighbor" policy; Latin America and World War II; Latin America and the United Nations.

### POLS

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

341 Government and Politics of Canada (5) A Critical analysis of parliamentary institutions, political parties, and the federal system in Canada. Prerequisite, 101 or equivalent.

### 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 or equivalent 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 (3) W Reshetar

Survey of the communist regimes of Poland, Hungary, Czechoslovakia, East Germany, and the Balkans. (Offered alternate years; offered 1974-75.)

### POLS

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

### 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 the Department of Economics as Economics 408.

### POL S

### 420 Foreign Relations of the Soviet Union (5) w

Reshetar

Ideological, historical, and strategic components of Soviet foreign policy; Comintern, Cominform, and international communist movement; Soviet policy in foreign trade, in international law and organization, and in specific geographic areas.

### POL S

### 425 International Law (5) A

Rohn

History and present status of international law. Feedback between law and politics in international relations. Current trends in treaties and court cases.

### POL S

### 426 World Politics (5) A

Modelski

The nation-state system and its alternatives; world distributions of preferences and power; structure of international authority; historical world societies and their politics.

### POL S

### 427 International Government and Administration (5) A

Comparative study of regional and general governmental international organizations.

### POLS

### 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.

### POLS

### 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.

### POLS

### Government and Politics of Sub-Saharan 439 Africa (5, max. 10) W

Survey of government and politics in the countries of tropical Africa, with major emphasis on political development and national integration in former British Africa. Prerequisite, 101 or permission.

### POLS

### 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

### Government and Politics of China (5) A 442 Townsend

Introduction to post-1949 government and politics, with emphasis on problems of political change in modern China. Prerequisite, junior standing.

### POLS

**Constitutional Regimes (5) W** 443 Cassinelli

Analyses of modern and premodern types of political regimes concerned with social stability, with special attention to contemporary representative democracy.

### POLS

### 444 Revolutionary Regimes (5) Sp

Analysis of the several types of political regimes concerned with effecting fundamental social change; emphasis on the twentieth century.

### POL S

### 445 Comparative Political Institutions (5) W Hitchner

Comparative study of the nature, structure, and function of the major institutions of government, including the party, executive, legislature, and judiciary. Prerequisites, 101 and one 300-level course in comparative government, or permission.

### POL S

### 446 Peasants in Politics (5) Sp Hill

Political interaction of peasants and governments, with emphasis on peasants' forms of autonomous political organization. Questions the utility of theories of modernization or political development in understanding this relationship and political interaction, suggesting instead a view of politics focused on power and participation.

### POL S

### 447 Comparative Politics in Selected Systems (5) W

Comparative study of nationally inherent and globally derived aspects of national political systems. Emphasis is on the extranational influences on national political cultures, governmental and political organization, and political processes in two or three national political systems. Prerequisite, permission.

### POL S

448 Comparative Federal Systems (5) Sp Intensive analysis of the development and operation of typical federal systems in established states, and comparisons with those recently adopted in developing areas. Attention is devoted to legal, political, and socioeconomic problems in these federal regimes.

### POL S

### Politics of Developing Areas (5) ASp 449 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**

### POLS

## 500, 501, 502 Language and Politics I, II, III (3,3,3)

Examination of leading issues and positions in the philosophy of language and their implications for, and connections with, the philosophy and methodology of political and social science. The emphasis in the Autumn Quarter is on the work of Wittgenstein. The emphasis in the Winter Quarter is on discussions of issues in the philosophy of social science influenced positively or negatively by Wittgenstein (e.g., Winch, Peters, Taylor, Malcolm, Davidson, MacIntyre). Spring quarter emphasis is on re-search and writing. Prerequisites, 500 for 501; 501 for 502.

### POL S

### 506 Contemporary Problems, Domestic and Foreign (3, max. 6) S

### POL S

509 Reason, Value, and Politics I (3) A Selected topics in the relationships between ethics and politics.

### POL S

510 Reason, Value, and Politics II (3) W Research and writing in the relationships between ethics and politics. Prerequisite, 509.

### POLS

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.

### POLS

### Seminar in Problems of Political Theory 514 (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 anarol theories of coll 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.

### POLS

### 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

### Seminar on World Politics and 522 **Organizations I (3) W** Modelski

Principles of world politics and problems of world order: war and systemic conflict. Prerequisites, 426 and permission.

### POLS

### 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

### Seminar on World Politics and 524 **Organizations III (3) Sp**

The United Nations: selected problems.

### POL S

525 International Law I: Policy (3) A Rohn

Inputs of international law into the decisional process in foreign policy. Effect of policy on law. Relevant roles of individuals and institutions in routine and crisis situations. Prerequisite, 425 or permission.

### POL S

### 526 International Law II: Treaties (3) W Rohn

Classical and modern views of treaties. Quantitative research in treaties as a reflection of trends in international law and politics. Global, regional, and national treaty patterns. Prerequisite, 425 or permission.

### POLS

### International Law III: Courts (3) Sp 527 Rohn

Past and present roles of courts and quasijudicial agencies in the development of inter-

national law. International judicial behavior. Prerequisite, 425 or permission.

### POLS

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 for-eign-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)

Inquiry into selected domestic and international problems. Prerequisite, permission.

### POLS

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

Seminar on Contemporary Chinese 533 Politics (3) Sp Townsend

Research on selected problems in contemporary Chinese politics. Prerequisite, 532 or permission.

### POL S

## 534 American Foreign Policy Formation (3)

Dennv

American foreign policy viewed whole, including defense policy, the relationships of foreign policy to domestic policies and priorities, and the full range of historical, constitutional, institutional, political, and theoretical questions related to the formation and execution of foreign policy in this broad sense. Offered jointly with the Graduate School of Public Affairs as Public Policy 534.

### POL S

### 535 International Relations of Modern China (3-5) Sp

Taylor

Case studies of the international relations of China from 1928 to the present. Lectures, discussion, critical review articles, and literature. Open to political science majors and regional studies candidates for the M.A.; others by permission.

### POL S

### 538 **Government and Politics in the Middle** East and North Africa (3) Sp

Study of political change in the area within the context of comparative politics; breakdown of traditional political systems; new range of choice expressed in competing ideologies; governmental and nongovernmental instrumentalities of change; and problems of international relations and regional conflict and integration.

### POLS

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.

### POLS

540 Seminar on Modern Indian 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

Cassinelli, Hitchner

Selected problems in the comparative analysis of political institutions, organizations, and systems.

### POL S

545 Seminar on Japanese Government and Diplomacy (3, max. 6) W Hellmann

### POL S

546 Seminar on Problems of Soviet Politics (3) W Reshetar

Selected problems of Soviet domestic politics. Prerequisite, 541 or permission.

### POLS

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 es-tablished democracies and in the developing countries, are discussed.

### POL S

### **Problems of Political Development** 549 (3, max. 9) Sp

Brass

Comparison of aspects of political change and development in both contemporary and historical developing societies.

### POLS

### 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.

### POLS

### 554 Legislative Politics (3, max. 6) AW Bone, Francis

Selected problems in legislative processes and leadership, state and national. Prerequisite, 451 or equivalent.

### POL S

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

### The Administrator and the Policy Process 570 (3) A Kroll

Context of public administration from the perspective of the administrator. Through case and research materials and field inquiries and interviews, the manifold roles and functions of the administrator are examined, particularly as he relates himself and his work to the process of implementing, making, and changing public policy. Offered jointly with the Graduate School of Public Affairs as Public Administration 501.

### POL S

571 Public Policy and Administration (3) W Kroll

Interaction between the bureaucracy and those institutions, organizations, and groups involved in the policy process. Analyses of current policy problems are made from this perspective. Of-fered jointly with the Graduate School of Public Affairs as Public Administration 502.

### POL S

## 572 Administrative and Executive Leadership (3) Sp Kroll

The nature of executive life in the public sector. The function of leadership in implementing, making, and changing policy. Leadership styles, the relation of leadership to its constituencies and communities. Offered jointly with the Graduate School of Public Affairs as Public Administration 503.

### POL S

### 573 · Public Management: Program Planning and Design (3) A

Shipman

Topics include the policy context of planning and programming, the institutionalization of purpose, the planning process, activity design, work scheduling and measurement, and program evaluation. Offered jointly with the Graduate School of Public Affairs as Public Administration 521.

POL S

### 574 Public Management: Budgeting (3) W Lyden, Pealy

Budgeting as a management process. Study of formulation and administration of government budget, including the role of budgeting in the policy process, approaches to budget formulation and analysis, the development of the PPB approach, and aspects of budget administration such as revenue estimating, allotment control, and cost accounting. Offered jointly with the Graduate School of Public Affairs as Public Administration 522.

### POL S

575 Public Management: Personnel (3) ASp Lvden

Study of line-staff decision making in the 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. Offered jointly with the Graduate School of Public Affairs as Public Administraton 523.

### POL S

### 576 Administrative Problems: **Micro-Organization (3) A** Shipman

Analysis and solution of problems involving the interaction of individuals and groups within organizations. Emphasis is placed upon the differences between the traditional and behavioral approaches to the understanding of the governmental organization, the motivation of the persons involved in the decision to produce, the nature of the decision to participate, the nature of conflict and innovation, and the limits of rationality. Offered jointly with the Graduate School of Public Affairs as Public Administration 511.

### POL'S

**Administrative Problems:** 577 Macro-Organization (3) W Shipman

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 con-cepts of organizational effectiveness and change. Offered jointly with the Graduate School of Public Affairs as Public Administration 512.

### POL S

### 578 Administrative Problems: Program Analysis (3) Sp Shipman

Applicability of systems approaches and systems modeling to various types of program problems. Emphasis is upon comprehensive program planning, approaches to factoring of alternatives, the evaluation of cost-utility relationships, and the assessment of alternative op-tions or "trade-offs" in activity components of large-scale action programs. Offered jointly with the Graduate School of Public Affairs as Public Administration 513.

### POL S

## 579 Comparative Administrative Systems (3)

Kroll

Methodological problems of research in comparative administration. Theoretical and substantive aspects of administrative systems in urban-industrial and developing nations. Offered jointly with the Graduate School of Public Affairs as Public Administration 551.

### POLS

### 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.

### POLS

## Approaches to Subnational Government (3) A 584

Analysis of current approaches and concepts in the study of subnational governmenturban, 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

### Seminar in Political Behavior (3, max. 6) 590 WSD

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 interna-tional organizations. Statistical analysis in-cludes 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,

### POLS

### 600 Independent Study or Research (\*)

### POLS

700 Master's Thesis (\*)

POLS

800 Doctoral Dissertation (\*)

### PSYCHOLOGY

### **Courses for Undergraduates** PSYCH

### 100 General Psychology (5) AWSp Fields

Survey of scientific and professional psychology, illustrating basic principles derived from experimental studies of human and animal behavior, including applications in the measurement, prediction, and development of human capabilities. Not open for credit to students who have taken 101 or 102.

### PSYCH

### 101, 101H Psychology as a Social Science (5) AWSpS

Beach, Keating, McKeever, R. Smith Survey of the scientific study of human behavior, covering experiments, observations, and theories relating to individual differences, personality, development, motivations, social behavior, deviant behavior, genetics and physiology of behavior, learning and cognitive processes, and sensory and perceptual processes. Discussion of social problems and the research psychologists, efforts to help characterize and solve these problems. 101H includes more extensive reading in texts and source material; a term paper is required. Prerequisite for 101H, permission of College of Arts and Sciences Honors Program adviser. Not open for credit to students who have taken 100.

### PSYCH

### 102, 102H Psychology as a Natural Science (5) AWSpS.Sp

McKeever, Sackett, Woods

Survey of the study of behavior from a nat-ural science viewpoint. Discussion of the components and mechanisms of behavior. Topics include evolution, genetics, and physiology of behavior, learning processes, motivation, individual differences, development, social behavior, and sensory, perceptual, and cognitive processes. 102H includes more extensive reading in texts and source material: a term paper is required. Not open for credit to students who have taken 100. Prerequisite for 102H, permission of College of Arts and Sciences Honors adviser.

### PSYCH

### 105 **Mnemonic Devices for Memory** Improvement (1) Sp

G. Loftus, Nelson Application of memory theory to everyday problems of memory (learning and retention). Surveys a variety of mnemonic devices, with brief descriptions of underlying theoretical mechanisms. Extensive use of class demonstrations. One aim of the course is to provide students with techniques that can improve memory.

### PSYCH

### 200 Comparative Animal Behavior (5) 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's adaptation to its natural habitat. Discussion of the importance of the findings of comparative animal behavior to understanding of human behavior. 102 or Biology 210 recommended.

### PSYCH

### Introduction to Personality and 205 Individual Differences (4) AWSpS Marlatt, R. Smith

Basic concepts and methods and background for more intensive study in the field of person-ality. 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, Mathematics 106. Replaces 211, 212 as statistics requirement for majors registered in the psychology bachelor of arts program.

### PSYCH-

### 217 **Introduction to Probability and** Statistics for Psychology (4) AWSpS

E. Loftus, G. Loftus, M. Smith Probability theory as a model for scientific inference. Probabilistic variables and experi-

mental outcomes, conditional probability, binomial and related distributions, experiments as samples, statistics and sampling distributions, the normal distribution, problems of estimation from experiments. Prerequisites, Mathematics 157 or 124, and psychology major standing. Required for majors in the psychology Bachelor of Science program or in the psychology honors or distinction pro-grams. Ad hoc honors credit available to students in either honors or distinction pro-grams. Prerequisite, permission of departmental honors adviser. (Formerly 302.)

### PSYCH

### 218 Statistical Inference in Psychological Research (4) AWSpS

E. Loftus, G. Loftus, M. Smith Hypothesis testing and its probabilistic and statistical basis. Development and application of techniques of statistical inference com-monly 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 bachelof of belence tion programs. Ad hoc honors credit available to students in the honors or distinction programs. Prerequisite, permission of depart-mental honors adviser. (Formerly 314.)

### PSYCH

### 222 Survey of Physiological Psychology (3) AWS

Douglas, Woodburne

Introduction to the brain and how it works. Detailed examination of learning, memory, sleep, the senses, and the emotions. Intended primarily for students who do not intend to specialize in physiological psychology. Prerequisite, major standing in a biological science or either 100 or 101 or 102.

### PSYCH

## 231, 231H Laboratory in Human Performance (5) AWSpS,Sp

G. Loftus, Nelson

Lectures and laboratory on selected aspects of human learning, perception, and performance. Prerequisites, 213 or 217; for 231H, permis-sion of College of Arts and Sciences Honors Program adviser. (Formerly 201, 201H.)

### PSYCH

### 232, 232H Laboratory in Animal Learning (5) AWSpS,W

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. (Formerly 202, 202H.)

### **PSYCH**

### 233, 233H Laboratory in Animal Behavior (5) AWSp

Barash

Experience with a variety of animal species and a variety of experimental procedures and instrumentation. Prerequisites, 100 or 101 or 102 and 200 or Biology 212, or equivalents; for 233H, permission of College of Arts and Sciences Honors Program adviser. (Formerly 203, 203H.)

### 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, Indian, and Asian groups.

### PSYCH

260 Psychological Aspects of Poverty (3) Sp Lumsdaine

Information about the psychological effects and causes of poverty and related social phenomena; the effect on psychological development, personality, mental health, and social behavior. Discussion of possible remedial steps.

### PSYCH

### 305 Deviant Personality (5) AWSpS Kohlenberg, Strother, 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

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 Day Care Center. Prerequisite, 306 or equivalent.

### PSYCH

### 345 Social Psychology (5) AWSpS Lumsdaine, 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) AWSp

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

### Survey of Cognitive Psychology (5) AW 355 Beach, E. Loftus

Survey of current theory and research in such areas as perception, attention, memory and learning, attitudes, thinking and decision making, and language. For both the student who wishes a survey and the student who intends additional work in any of the above content areas. Prerequisite, 10 credits in psychology, including an introductory course.

### **PSYCH**

### Laboratory in Social Psychology (5) ASp 361 Keating, H. Mitchell

Practice and discussion of methods of systematic observation, content analysis, laboratory and field; experimental manipulation in social psychology; individual research projects. Prerequisites, 213 or 218, 345 and major standing, or permission.

### PSYCH

### 400 Learning (5) WS

**Bolles** Experimental research and basic theories primarily in animal learning. Prerequisite, 100 or 101 or 102.

### **PSYCH**

### 403 Motivation (5) AWSp M. Smith

Theory and research on reinforcement, punishment, frustration, preference, instinctual mechanisms, and other factors controlling animal behavior. Prerequisite, 100 or 101 or 102.

### PSYCH

### 405 Advanced Personality: Theory and Research (5) WSp Becker, Sarason

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 Training in electricity and electronics to enable understanding, selection, and use of basic general-purpose psychological research apparatus. Topics include direct- and alternating-current circuits, measuring instruments, direct-current power supplies, amplifiers, relays, transducers, and bioelectrical recording. Emphasis on first-hand experience with research-caliber equipment. Registration limited to fifteen students. Prerequisites, junior or senior major standing and permission. (Offered alternate years; offered 1975-76.)

### PSYCH

### History of Psychology (5) A 407 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

Ethology (3) W 409

### Barash

Perception, nervous integration, movement, motivation, instinct, learning, and social behavior in animals, with emphasis upon their evolution and selective significance. Offered jointly with the Department of Zoology as Zoology 409. Prerequisites, 200 or Zoology 210 and 212, or equivalents.

### PSYCH

### 410 Deviant Development (5) ASp

Perry

Introduction to developmental deviations, including sensory-motor handicaps, mental retardation, brain injury and emotional distur-bances. 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

### 416 Animal Behavior (5) ASp R. Lockard

Analysis of laboratory experiments, field investigations, and current theory of the behavior of animals from protozoa to man, including theoretical accounts of selected problems. Prerequisite, 200 or 233 or 10 credits in biology or zoology.

### PSYCH

### 417 Ethology and Human Behavior (3) W J. Lockard

Analysis of animal social systems in comparative perspective, with emphasis on communication systems and adaptive significance of the social structure. Against this background, examination of human social behavior from an ethological viewpoint. Prerequisite, 200 or 409 or 416, or Zoology 409.

### **PSYCH**

### 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 Zoology 409, or equivalents. (Offered alternate years; offered 1974-75.)

### PSYCH

### 421 Neural Basis of Behavior (5) ASp Woodburne

Anatomical and physiological principles involved in the integrative action of the nervous system and the results in behavior of this neural activity. Prerequisites, 100 or 101 or 102, and 10 credits in biology or zoology.

### PSYCH

### 422 Physiological Psychology (5) WSp Douglas

Physiological mechanisms in behavior, including those basic to emotion, fatigue and sleep, learning, and memory. 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 study of vision in human subjects; emphasis on correlation of human visual functioning with known optical, biochemical, anatomical, and physiological factors. Offered jointly with the Department of Physiology and Biophysics as Physiology and Biophysics 424. Prerequisite, permission, some background in 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 six students. Prerequisites, 421 and permission. (Offered alternate years; offered 1974-75.)

### PSYCH

### 427 Behavioral Endocrinology (5) W

Woods

Comprehensive survey of the endocrine system and how its secretions influence and are influenced by behavior. Emphasis on relationships between the nervous and endocrine systems. Prerequisites, 421 and two quarters of zoology, or permission.

### PSYCH

 430 Problems of Assessment in Psychology
 (3) A 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 of some classical vision experiments or design, or both, and completion of original vision experiments. Limited to ten students. Prerequisites, 424 and permission. (Offered alternate years; offered 1975-76.)

### **PSYCH**

### 441 Perceptual Processes (5) AWSp Culbert, Peeples

Consideration of the ways in which experience is organized. Emphasis on experimental and theoretical treatment of perceptual aspects of sensory modalities, relations between physical and psychological dimensions, nonstimulus determiners of the perceived world, and mediational feedback. Prerequisite, 15 credits in psychology.

### PSYCH

### 442 Measurement and Design in Attitude Research (5)

Major theories and problems of research design and measurement in studies of attitude formation and change. Laboratory sessions using traditional and recent approaches to the measurement of attitudes. Emphasis on theoretical implications of various measurement techniques. Students are required to undertake a report on an attitude measurement project. Prerequisites, 213 or 218 and 345, or equivalents. (Not offered 1974-75.)

### **PSYCH**

### 443 Social Psychology of Prejudice (3) Examination of social psychological theory and research regarding the development, maintenance, and dissolution of prejudicial attitudes, with particular emphasis on anti-Black sentiment. Prerequisite, 345. (Not offered 1974-75.)

### PSYCH

## 444 Social Influence and Attitude Change (3)

### Lumsdaine

Discussion of research on the nature and effects of social influence, with special emphasis on attitude formation and change, conformity, behavior, prejudice, and propaganda. Prerequisite, 345.

### **PSYCH**

### 445 Theories of Social Psychology (5) W Steele

Individual determinants of social behavior, processes, and outcomes of social interaction, their effects on the individual and groups. Prerequisites, 345 and senior or graduate major standing.

### PSYCH

### 446 Objective Assessment of Personality (3) 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 industrialsocial psychology and of the application of social psychology to the behavior of individuals in large organizations and their subunits. Prerequisites; 218 and 345, or equivalents. (Offered alternate years; offered 1975-76.)

### PSYCH

### 450H Research Seminar in Psychology (2, max. 6) 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) A Dale

First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Offered jointly with the Department of Linguistics as Linguistics 447. Prerequisite, 306 or Linguistics 400.

### PSYCH

### 461 Human Learning (5)

McKéever lected experimental prob

Selected experimental problems and theoretical interpretations, with emphasis on verbal learning. (Not offered 1974-75.)

### **PSYCH**

### 462 Human Memory (5) A

McKeever

Discussion of recent literature on forgetting and retention.

### PSYCH

### 463 The Pathology of Human Memory (5) W M. Smith

Examination of effects of brain damage on human memory; comparison of observed kinds of losses with current theories of memory. Emphasis on amnesia and consideration of other impairments of intellectual function (aphasia, agnosia, apraxia) as they relate to memory. Prerequisite, 421; 461 or 462 recommended.

### PSYCH

### 465 Intelligence in Psychology (3) Sp Hunt

Historical and contemporary treatments of the concept of intelligence by psychology: evolution and validity of techniques for intellectual assessment; biological and environmental issues in intellectual assessment; intelligence and personality; experimental and psychometric indicators of the future role of intelligence in psychology. Prerequisite, 15 credits in psychology, including one statistics course.

### **PSYCH**

### 468 Information Processing (4)

Human thought is treated as a phenomenon to be described by formal models. Current theories and experimental studies of rational information processing; emphasis on how man notices, recognizes, remembers, and recalls information that subsequently can be used in rational problem solving; detailed discussion of theoretical models of attention, memory, and recall; cognitive models of rational problem solving. Prerequisite, 231 or 355, or equivalent. (Not offered 1974-75.)

### PSYCH

### 475 Computing in Behavioral Sciences (5) Sp G. 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 1974-75.)

### PSYCH

### 489 Clinical Psychology (3) W 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 supervi-

sion 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 instructor.

### PSYCH

### 500 Learning and Motivation (3) Sp Bolles

General survey of animal learning and motivation; emphasis on recent problems, findings, and theoretical developments; topics may include avoidance learning, cyclic behavior, defensive behavior, food preferences, incentive motivation, noncontingent reinforcement, and territoriality. Prerequisite, graduate major standing.

### PSYCH

### 503 Advanced Social Psychology (3) A Fiedler

Problems in person perception; attitude; socialization; and group processes. Prerequisite, graduate major standing.

### PSYCH

### 504 Theories and Issues in Developmental Psychology (4) A

H. Robinson Examination of major theoretical approaches to the study of human development, with presentation of representative empirical 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

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 Consistency Theories in Social Psychology (3)

Theoretical and empirical work that focuses on the ramifications of a need or pressure for cognitive consistency; dissonance, balance, and congruity theories are critically evaluated on the basis of current research. Prerequisites, 503 and graduate major standing. (Not offered 1974-75.)

### PSYCH

### 511 Experimental Approaches to Personality - (3) Sp

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

### 514-515 Experimental Design (3-3) W,Sp Edwards

Design of experiments and analysis of experimental data in the behavioral sciences. Required of all first-year graduate majors. Must be taken in sequence. Prerequisite, elementary statistics or permission.

### PSYCH

### 516 Psychometric Techniques (3)

C. Lunneborg

Topics in regression analysis, measurement reliability and validity, and development of models for prediction, selection, and classification. (Not offered 1974-75.)

### PSYCH

### 517 Mathematical Psychology (3) Sp ° Rose

Application of mathematics (drawn from set theory, finite mathematics, and probability theory) in the areas of measurement, psychophysics, and learning. Open to undergraduates with permission. Prerequisite, 515 or equivalent. (Offered alternate years; offered 1974-75.)

### PSYCH

### 518 Mathematical Models of Learning (3) Rose

Application of mathematical models in basic learning situations, such as paired-associate learning, concept formation, partial reinforcement and probability learning. Open to undergraduates with permission of instructor. Prerequisites, 515 or 517 or Mathematics 391,

or permission. (Offered alternate years; offered 1975-76.)

### PSYCH

### 519 Statistical Methods in Longitudinal Research (3) Sp Sackett

Presentation of those aspects of statistics and experimental design unique to, or heavily used in, developmental research, including: behavioral observation methods, analysis of variance and nonparametric techniques, and time series analysis methods. Prerequisites, 515, graduate major standing.

### **PSYCH**

520 Teaching Practicum in Psychology (3) Discussion of models of excellent teaching in psychology utilizing videotape to allow the students to view their own teaching efforts. The aim is to help the student become an effective teacher of psychology. Prerequisites, graduate major standing and permission. (Not offered 1974-75.)

### **PSYCH**

### 524 Cognitive Approaches to Human Memory (3)

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 1975-76.)

### **PSYCH**

### 525 Psychodiagnostic Testing (3) Sp Perry

Training in administration, scoring, and interpretation of individual intelligence tests, projective tests, and other major clinical techniques. Required of all first-year graduate majors in clinical psychology. Prerequisite, graduate major standing.

### **PSYCH**

526 Psychological Assessment of Children (3) W

*Perry* Review of a variety of assessment techniques appropriate to children, including infant tests, tests for special problems of preschool and school-age children, projective tests, family interviews, and target observational assessment; training in administration of selected techniques. Either 526 or 527 is required of all second-year graduate majors in

### PSYCH

### 527 Psychological Assessment of Adults (3) W

clinical psychology. Prerequisites, 525 or

Broedel

equivalent, and permission.

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) C. Lunneborg

Special quantitative techniques, including matrix algebra, used in multivariate psychological research; theoretical foundations of factor analysis; computational procedures and application of factor analytic models to psychology; emphasis on the development and use of appropriate computer techniques. Prerequisite, 218 or equivalent. (Offered alternate years; offered 1975-76.)

### PSYCH

### 540 Seminar on Clinical Psychology (2) AWSp

Becker, Broedel, Marlett, Sarason, Sue May be repeated for credit. Prerequisite, permission.

### PSYCH

541 Seminar on Cognitive Processes (2) WSp E. Loftus, G. Loftus, Nelson

May be repeated for credit. Prerequisite, permission.

### PSYCH

542 Seminar on Animal Behavior (2) AW Barash, Bolles, J. Lockard, R. Lockard May be repeated for credit. Prerequisite, permission.

### PSYCH

543 Seminar on Developmental Psychology (2) AWSp

H. Robinson, Slaby

May be repeated for credit. Prerequisite, permission.

### PSYCH

544 Seminar on Experimental Psychology (2) May be repeated for credit. Prerequisite, permission.

### PSYCH

545 Seminar on Human Learning (2) May be repeated for credit. Prerequisite, permission.

PSYCH

### 546 Seminar on Learning (2)

May be repeated for credit. Prerequisite, permission.

### PSYCH

547 Seminar on Motivation (2) ASp Bolles

May be repeated for credit. Prerequisite, permission.

### PSYCH

548 Seminar on Perceptual Processes (2) Culbert

May be repeated for credit. Prerequisites, 441 and permission.

### PSYCH

549 Seminar on Physiological Psychology (2) Douglas, Woods

May be repeated for credit. Prerequisite, permission.

### PSYCH

550 Seminar on Psycholinguistics (2) AWSp Culbert, Dale, M. Smith

May be repeated for credit. Prerequisites, 447 and permission.

### PSYCH

### 551 Seminar on Psychophysics (2)

May be repeated for credit. Prerequisite, permission.

### PSYCH

552 Seminar on Quantitative Techniques (2) Sp

Edwards, C. Lunneborg, Rose May be repeated for credit. Prerequisite, permission.

### PSYCH

553 Seminar on Social Psychology (2) Keating, H. Mitchell, Steele

May be repeated for credit. Prerequisite, permission.

### PSYCH

### 554 Seminar on Decision Processes (2) Sp Beach

May be repeated for credit. Prerequisite, permission.

### PSYCH

555 Seminar on Programmed Learning (2) May be repeated for credit. Prerequisite, permission.

### PSYCH

560 Seminar (\*) AWSp

May be repeated for credit. Prerequisite, 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 disabilities. Emphasis is placed on reactions to physical disability, the concept of work, the assessment of disabled persons, and the interaction between physical and mental disabilities. Prerequisite, graduate major standing. (Not offered 1974-75.)

### PSYCH

### 591 Introduction to Clinical Psychology (3) A Wagner

Introduction to clinical psychological problems, methods, and techniques. Required of all first-year graduate majors in the clinical psychology training program. Prerequisite, graduate major standing in clinical psychology training program.

### PSYCH

### 592, 593 Clinical Methods (6,6) AWSpS, AWSpS



Advanced training in the application of clinical psychological testing and interviewing. Required of all second-year graduate majors in the clinical psychology training program. Prerequisites, 591 and graduate major standing.

### PSYCH

### 594 Advanced Personality Theory (5) A R. Smith, Zaro

Theoretical problems in the study of personality development relating to the psychodynamics of personality organization. Required of all graduate majors in the clinical psychology training program. Prerequisite, 405 or permission.

### 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 (1-5, max. 36) AWSpS

Becker, Broedel, Kohlenberg, Marlatt, Perry, Sarason, R. Smith, Strother, Sue, Wagner, Zaro

Prerequisites, second-year graduate major standing and permission.

### PSYCH

599 Readings in Psychology (\*) 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, Hanzeli, 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

### The Teaching of Foreign Literature (3) 475 Keller

The methodology of teaching a foreign literature, with demonstrations by the instructor and practice by students; preparation of lectures; study of discussion techniques. Offered jointly with the College of Education as EDC&I 435. Prerequisites, senior standing and permission.

### **Courses for Graduates Only**

### ROM

505, 506 Advanced Romance Linguistics (3,3) Advanced problems in the phonological, morphological, and syntactical analysis of the Romance languages. Descriptive, comparative, and historical considerations. Prerequisites, French 401, 402, or Spanish 400, or French or Spanish 541, 542.

### ROM

### 521, 522 Seminar on Romance Linguistics (3.3)

Specific problems in linguistic analysis of the Romance languages. Prerequisites, 401, 402.

### ROM

### 531 Problems in Romance Linguistics (2-5, max. 10)

Contreras, Hanzeli, 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

**Catalan Language and Literature** 535 (3, max. 9) Algeo, 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 cor-respond to 101, 102, 103, but students who wish to transfer to day school courses must satisfactorily complete placement examinations, including an oral proficiency test. All assignments are written, but oral practice is provided through purchase and use of tape recordings. Purchase of a tape recording, available only through the Division of Evening and Extension Credit Programs, Office of Independent Study, is highly recommended.

### FREN

### 201, 202, 203 Intermediate (5,5,5) AWSp, AWSp,AWSp

Systematic review of French grammar. Intensive practice in writing and conversation. Readings in literature, culture, and the sci-ences. 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

### 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. Prerequisite, 203 or 221 or 222.

### FREN

### 306 Survey of French Literature: 1850 to the Present (3) Sp

From the realists to contemporary writing. Prerequisites, 203 or 221 or 222.

### FREN

307 Composition (3) S

For participants in the Foreign Study Program. Compositions on topical subjects of 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

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

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 tradi-tion; 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

### The Phonological Structure of French (3) 400 Hanzeli

Linguistic study of the French sound system. Prerequisite, Romance 401 or Linguistics 400.

### FREN

401 The Morphological Structure of French (3) Hanzeli

Linguistic study of French Morphology. Prerequisite, Romance 401 or Linguistics 400.

### FREN

### 402 The Syntactic Structure of French (3) Hanzeli

Linguistic study of French syntax. Prerequisite, Romance 401 or Linguistics 400.

### FREN

### 403 Background of Modern French (3) Klausenburger

Linguistic analysis of the important developments in the history of the French language from its Latin origin to contemporary speech. Prerequisite, the equivalent of two college years of French.

### FREN

### 404 Old French (3)

Field

Designed for acquisition of reading facility in Old French through intensive study of selected texts. Prerequisite, Romance 401.

### FREN

### 407 Advanced Composition (3) S

Compositions on an advanced level. Emphasis on matters of style rather than on grammar. Prerequisite, 303 or equivalent.

### FREN

### 408 Explication de Texte (3) Close study of short pieces of French prose and poetry. The method consists of a literary analysis of the text from different critical viewpoints: biographical, historical, etc. Lectures, 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 ambiance. Prerequisite, 304 or 410 or permission.

### FREN

### 412 French Literature of the Seventeenth Century: Baroque (3)

Leiner, Wortley

### Study of seventeenth-century literature, with emphasis on cultural background and the

## Baroque movement. Prerequisite, 304. FREN

### 413 French Literature of the Seventeenth Century: Classicism (3)

Leiner, Wortley

Study of seventeenth-century literature, with emphasis on the development of classicism. Prerequisite, 304 or 412 or permission.

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### FREN

### 414 French Literature of the Eighteenth **Century: Enlightenment (3)** Ellrich

Study of eighteenth-century literature, with emphasis on the development of the Enlightenment ideology. Prerequisite, 305.

### FREN

### 415 French Literature of the Eighteenth Century: Post-Enlightenment (3) Ellrich

Study of eighteenth-century literature, with emphasis on the "dark side of the Enlightenment" and nascent romanticism. Prerequisite, 414 or permission.

### FREN

### 416 French Literature of the Nineteenth Century: Romanticism (3) Dale

Study of nineteenth-century literature, with emphasis on romanticism and the early manifestations of realism. Prerequisite, 305.

### FREN

### 417 French Literature of the Nineteenth Century: Realism and Symbolism (3) Dale

Study of nineteenth-century literature, with emphasis on the realist, naturalist, and symbolist currents. Prerequisite, 416 or permission.

### FREN

### 418 French Literature of the Early **Twentieth Century (3)**

Jones, Leiner

Study of twentieth-century literature, with emphasis on the period 1900-1939. Prerequisite, 306

### FREN

### 419 French Literature Since World War II (3) Jones, Leiner

Study of twentieth-century literature, with emphasis on the period 1939 to the present. Prerequisite, 418 or permission.

### FREN

### 420 Fiction: 1600-1680 (3)

W. Leiner

Prerequisite, 304.

FREN

421 Fiction: 1680-1800 (3) Ellrich Prerequisite, 305.

### FREN

424 Fiction: 1800-1850 (3) Dale

Prerequisite, 305 or 306.

### FREN

Fiction: 1850-1900 (3) 425 Dale Prerequisite, 306.

Jones, J. Leiner

Jones, J. Leiner

Fiction Since 1950 (3)

Prerequisite, 327 or equivalent.

Advanced Conversational French (2-8,

Prerequisite, 306.

Prerequisite, 306.

max. 8)

### FREN Fiction: 1900-1950 (3) 426

FREN

FREN

437

427

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### 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, Vernier Prerequisite, 306.

### FREN

446 Poetry: Twentieth Century (3) C. Wilson Prerequisite, 306.

### FREN

### 451 History and Literature of the French Religious Wars (5) Sp

Griffiths, Keller

Study of the major political, social, and religious movements and events of, and related to, the French religious wars of 1560 to the end of the century, along with the treatment of these in the prose, poetry, and drama of the period. For students receiving French credit, readings must be done in French.

### FREN

### 452 The French Enlightenment Ellrich

French thought and literature of the eighteenth century.

### FREN

453 Sixteenth-Century Literary Prose (3) Keller

Prerequisite, 304.

### FREN

454 Nonfiction of the Classic Period (3) Christofides, Keller, Wortley Prerequisite, 304.

### FREN

457 Twentleth-Century Nonfiction (3) Jones, Kern Prerequisite, 306.

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### FREN

### 458 French Art and Literature: Period Studies (5) Sp Jones

Comparative studies of theme and technique in art and literature to illustrate major concerns of a particular period as expressed in these two media. Offered jointly with the School of Art as ART 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

461 Seventeenth-Century Drama (3) W. Leiner, Wortley Prerequisite, 304.

FREN

### 463 Romantic Drama (3) Dale

Prerequisite, 305.

### FREN 464 Realist and Naturalist Drama (3) Prerequisite, 306.

### FREN

465 Twentieth-Century Drama (3) W. Leiner

Prerequisite, 306.

### FREN

470 Cinema (3) Dale

Major films and figures of French cinema from the beginnings to the present.

### FREN

### 474 Linguistics and the Teaching of French (3) Hanzeli

Examination of areas of linguistics that can be particularly helpful to the French teacher. Prerequisite, 401 or permission.

### FREN

### 477 African Literature in French: 1939 to the Present (3) W

Leiner Survey of African literature from 1939 to the present. Readings, discussions, and reports on representative works in poetry, prose, and drama by Cesaire (West Indies), Senghor (Senegal), Damas (Guiana), Camara Laye (French Guinea), B. Dadie (Ivory Coast), Ouologuem 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 Sefrioui and Driss Chraibi (Morocco). Readings are in French.

### FREN

480 Social and Cultural Background (3) H. Nostrand

Common values, presuppositions, social behavior patterns and institutions of the culture area, as differentiated by social classes, regions, age groups, and time change over the past twenty years. Conducted in English, unless all registrants are sufficiently fluent in French. For French majors, some reading in French, with papers written in French.

### FREN

490H Honors Seminar (6, max. 12) AWSp

### FREN

497, 498 The French-Speaking Countries and Their Culture I, II (3,3) A,W

J. Leiner, Nostrand Readings on aspects of French literary tradi-

tion; 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

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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) Èllrich

### FREN

556 Studies in Nineteenth-Century Nonfiction (3, max. 9)

### FREN

557 Studies in Twentleth-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

Studies in Twentleth-Century Drama 564 (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

Literary Problems: Renaissance 592 (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 oralaural. 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.

### ITAI.

### 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. Pur-chase 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

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, interview in bransfer to day school 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 record-ings. 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

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 Linguistics 400, or Ro-mance 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. (Formerly 304, 305, 306.)

### 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, Sannazzaro, 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 Canti with lectures, discussions, reports. Prerequisites, 304, 305, 306.

### ITAL 460 Verismo (3)

Friedrich

Study of Giovanni Verga's main works within the historical background and development of Italian "Verismo." Prerequisites, 404, 405, 406.

### ITAL

### 465 Contemporary Italian Narrative (3) Friedrich

Critical reading of selected modern exponents of the short story and novel. Prerequisites, 404, 405, 406, or equivalent.

### ITAL

490 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)

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 oralaural. Oral practice in the language laboratory is required. Prerequisites, for 102: 101 or college equivalent, or placement test; for 103: 102 or college equivalent, or placement test.

### PORT

111, 112, 113 · Elementary (5,5,5)

Administered by the Office of Independent Study. Basic study of Portuguese grammar and idiomatic usage of the language. The three courses correspond to 101, 102, 103, but students wishing to transfer to day school courses must satisfactorily complete placement examinations, including oral proficiency test. All assignments are written, but oral practice is provided through purchase and use of tape recordings. Purchase of a tape recording, available only through the Division of Evening and Extension Credit Programs, Office of Independent Study, is highly recommended.

### PORT ...

150 Accelerated (5)

For graduate students in Spanish who wish to develop a rapid command of Portuguese primarily for reading purposes. Prerequisite, graduate standing in Spanish or permission.

PORT

201, 202, 203 Intermediate (5,5,5) A,W,Sp Modern texts, composition, conversation, and functional grammar. Students with advanced standing in Spanish courses may apply to instructor for permission to enter 301, instead of 201, after 103. Prerequisites, for 201: 103 or equivalent, or permission; for 202: 201; for 203: 202.

### PORT

### 301, 302 Advanced Syntax and Composition (3,3) A,W

Students with advanced standing in Spanish courses may apply to instructor for permission to enter 301 after 103. Prerequisites, for 301: 203 or equivalent, or permission; for 302; 301.

### PORT

**303 Portuguese Stylistics (3) Sp** Functional grammar review; creative written and oral composition and reading with special attention to problems of style. Prerequisite, 302.

### PORT

304 Survey of Luso-Brazilian Literature:

Middle Ages and Renaissance (3) A Prerequisite, 203 or equivalent, or permission.

### PORT

305 Survey of Luso-Brazilian Literature: Seventeenth, Eighteenth, and Early Nineteenth Centuries (3) W

Prerequisite, 203 or equivalent, or permission.

### PORT

306 Survey of Luso-Brazilian Literature: Late Nineteenth and Twentieth Centuries (3) Sp

Prerequisite, 203 or equivalent, or permission.

### PORT

310 Introduction to Brazilian Literature (3) Sp

393

Prerequisite, 302 or permission.

### ARTS AND SCIENCES

### PORT

327 Advanced Conversation (2, max. 8) Prerequisite, 203 or equivalent, or permission.

### PORT

### **390** Supervised Study (2-5, max. 20) AWSp Prerequisite, permission of the instructor and the undergraduate Portuguese adviser.

### PORT

### 409 Portuguese Phonetics (3) Algeo

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)

### Algeo

Phonological, morphological, and syntactical development of the Portuguese language from its origin to the present. Prerequisite, Romance 401 or equivalent.

### PORT

590 Special Seminar and Conference (1-9, max. 30) AWSp

Group seminars or individual conferences are scheduled under this number to meet special needs. Prerequisite, permission of Graduate Program Adviser.

### PROVENCAL

### PROV

534 Provencal Language and Literature (3) Field

### ROMANIAN

### RMN

401, 402, 403 Elementary Romanian (5,5,5) A,W,Sp

### Augerot

401, 402: comprehensive introduction to both spoken and literary Romanian. 403: designed to increase the student's vocabulary and enhance his knowledge of grammar through the reading of short fictional material in modern Romanian. Offered jointly with the Department of Slavic Languages and Literature as Romanian 401, 402, 403.

### RMN

404, 405, 406 Advanced Romanian (5,5,5) Continuation of 401, 402, 403, Offered joint

Continuation of 401, 402, 403. Offered jointly with the Department of Slavic Languages and Literature as Romanian 404, 405, 406. Prerequisite, 403 or permission.

phological, syntactical, and lexical structures of

modern Romanian. Prerequisite, Romance 401

### RMN

or permission.

420, 421 Structure of Romanian (3,3) Descriptive analysis of the phonological, mor-

## SPANISH

### SPAN

## 101, 102, 103 Elementary (5,5,5) AW,AWSp,AWSp Methods and object

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 exam-inations, including oral proficiency test. All assignments are written, but oral practice is provided through purchase and use of tape recordings. Purchase of a tape recording, available only through the Division of Evening and Extension Credit Programs, Office of Independent Study, is highly recommended.

### SPAN

### 121 Chicano History and Culture (5)

Introduction to Chicano history and cul-ture, including origins, customs, traditions, economics, politics, contemporary goals.

### 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

### Spanish for the Elementary School (5) S 128 Friedrich

Practice in the basic language skills is combined with the demonstration and analysis of methods and techniques appropriate to FLES. Emphasis is given to the language structures and vocabulary that normally occur in elementary school Spanish. Offered jointly with the College of Education as EDC&I 132.

### SPAN

### 201, 202, 203 Intermediate (5,5,5) AWSp, AWSp,AWSp

Intensive practice in speaking, reading, and writing. Systematic review of Spanish grammar. Oral practice based on selected pieces of Spanish literature. Prerequisites, for 201: 103 or college equivalent, or placement test; for 202: 201 or college equivalent, or placement test; for 203: 202 or college equivalent, or placement test.

### SPAN

### 211, 212, 213 Intermediate (5,5,5)

Administered by the Office of Independent Study. Intensive practice in reading and writing. Functional review in grammar. The three courses correspond to 201, 202, 203, but students wishing to transfer to day school courses must satisfactorily complete placement examinations, including oral proficiency test. All assignments and examinations are written, but oral practice is provided through purchase and use of tape recordings. Purchase of a tape recording, available only through the Division of Evening and Extension Credit Programs, Office of Independent Study, is highly recommended. Prerequisites, 113 for 211; 211 for 212; 212 for 213; or college equivalent.

### SPAN

### 221 Prose Readings in Spanish (5) Sp

Readings and discussion of nonfiction prose texts in Spanish. Reading material concentrates on the social sciences, such as aspects of Hispanic cultures, recent history, and contemporary social issues of Spanish-speaking countries. Prerequisite, 202 or permission.

### SPAN

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) AW,WSp

Prerequisites, for 301: 203 or college equivalent, or placement test; for 302: 301.

### SPAN

### 303 Spanish Stylistics (4) ASp

Functional grammar review; creative written and oral composition and reading with special attention to problems of style. Prerequisite, 302.

### SPAN

### 304 Survey of Spanish Literature: 1140-1498 (3) A

Masterpieces of Spanish literature from origins to 1498. Prerequisite, 203 or college equivalent, or placement test, and 350 or 351 or 352.

### SPAN

### 305 Survey of Spanish Literature: 1498-1681 (3) W

Prerequisites, 203 or college equivalent, or placement test, and 350 or 351 or 352.

### SPAN

### 306 Survey of Spanish Literature: 1681 to the Present (3) Sp

Prerequisites, 203 or college equivalent, or placement test, and 350 or 351 or 352.

### SPAN

### 311 Black Literature of the Caribbean (3) Rodden

Survey in English of the rise of Black literature from its beginnings in the Afro-Cuban current of the vanguardista movement of the 1930s to the present. Authors from the French-, English-, and Spanish-speaking territories are studied.

### SPAN

### 312 Black Poetry of the Caribbean (3) A Bodden

The poetry of the Caribbean centered around the problem of being Black in a colonial situation. The evolution from a superficial attitude to a viable politicoracial one is examined.

### SPAN

### 327 Advanced Conversation (2. max. 8) AWSp

Prerequisite, 203 or equivalent, or placement test.

### SPAN

331 Themes in Mexican-American Studies (5) Examination of significant historical and cultural themes of the Mexican-American experience. Creation of 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. Prerequisite, 203 or college equivalent, or placement test.

### SPAN 351 Poetry (3) A Generic study of Spanish poetry. Prerequisite, 203 or college equivalent, or placement test.

### SPAN

### 352 Fiction (3) W

Generic study of Spanish fiction. Prerequisite, 203 or college equivalent, or placement test.

### SPAN

359 Introduction to Mexican Literature (3) Main outlines of literary expression in Mexico, from pre-Hispanic poetry to the contemporary period. Reference is made to Chicano literature in the United States. Prerequisite, 303 or permission.

### SPAN

390 Supervised Study (2-6, max. 20) AWSp Prerequisite, permission of the instructor and the undergraduate Spanish adviser.

### **SPAN**

### 400 The Structure of Modern Spanish (3) W Contreras

Analysis of the spoken language from a linguistic point of view; phonological, morphological, and syntactic analysis. Prerequisites, 203, and Romance 401 or Linguistics 400.

### SPAN

### 408 The Structure of the Spanish Language (3)

Advanced study of the structure of the Spanish language. Syntactical patterns are carefully examined. Guiding principles are derived from internal evidence. All important aspects of grammar and syntax are studied, and drill is concentrated on especially problematic points. The approach is that of a native studying his own language. The course is conducted in Spanish. Prerequisites, 301, 302, 303, or permission.

### SPAN

### 409 Advanced Phonetics (3) AWSp Algeo, Contreras, 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.

# R

### 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 Quijote* 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

### 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 Alarcón. 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-Inclán, Sastre, Lorca, and others. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

### SPAN

### 450 Spanish Drama and Play Production (2-6) Anderson

Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

### SPAN

 451, 452, 453 Spanish Literature Since 1700 (3,3,3) A,W,Sp

Anderson, 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 Ybaira

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.

### 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
# ARTS AND SCIENCES

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

#### ROM

700 Master's Thesis (\*) AWSp

## ROM

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 the School of Art as ART H 485. Prerequisite, background in French literature or art history (the appropriate 300-level course in art history or the appropriate 400-level survey course in French literature).

#### FREN

481 Twentieth-Century French Novel in English (3-5) Wilson

# 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 Twentleth-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.

396

#### FREN

485 Racine and Molière in English (3) Wortley

#### FREN

486 Literature of the Enlightenment in English (3) Elirich

#### 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 Bocaccio to modern masters of the form. The translations are studied both as examples of narrative technique and as reflections of particular moments in Italian cultural history. Prerequisite, at least sophomore standing.

#### ITAL

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, Calderón. Artistic values and the social-historical context of Renaissance Spain.

# SCANDINAVIAN LANGUAGES AND LITERATURE

#### **Courses for Undergraduates**

101-102, 103 Elementary Danish (5-5,5)

Fundamentals of oral and written Danish.

## DANISH DAN

A,W,Sp

Rossel

#### DAN

220 The Danish Short Story and Fairy Tale (3) A Rossel

Selected short stories and fairy tales in Danish literature. Prerequisite, 103 or équivalent.

#### DAN

#### 221 Modern Danish Fiction (3) W Rossel

The study of a novel by J. P. Jacobsen, Martin A. Hansen, or other modern Danish novelists. Prerequisite, 220 or equivalent.

#### DAN

#### 222 Danish Drama and Film (3) Sp Rossel

Study of a play by Kaj Munk or Soya and a film by Carl Dreyer. Prerequisite, 221 or equivalent.

#### DAN

#### 223, 224, 225 Danish Conversation and Composition (2,2,2) A,W,Sp 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

#### 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)

AŴSD 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

Conrov 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

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

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

Norwegian Lyrical Poetry (3) W 301 Flatin, Sehmsdorf Prerequisite, 222 or equivalent.

#### NORW

Drama After Ibsen (3) Sp 302 Flatin, Sehmsdorf Prerequisite, 222 or equivalent.

#### NORW

303, 304, 305 Advanced Norwegian Conversation and Composition (2,2,2) A,W,Sp

Flatin, Sehmsdorf Prerequisite, 225 or equivalent.

#### NORW

The Norwegian Short Story (3) 350 Flatin, Sehmsdorf

Generic study of the Norwegian short story. Prerequisite, 220 or permission.

#### NORW

Norwegian Romanticism (3) 351 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.

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# NORW

#### 490 Supervised Reading (\*, max. 10) AWSp Sehmsdorf

ARTS AND SCIENCES

Students with an adequate reading knowledge of Norwegian pursue in this course a program of study in a selected area of Norwegian lan-guage, 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

Modern Swedish Poetry (3) AW 220

Beijbom, Jarvi Selected poems by Fröding, Lagerkvist, Södergran, and others. Prerequisite, 103 or equivalent.

#### SWED

221 The Swedish Short Story (3) WSp

#### Jarvi

Hjalmar Söderberg and his short stories. Prerequisite, 220 or equivalent.

#### SWED

222 Modern Swedish Drama and Film (3) ASp Jarvi

Shorter works of Par Lagerkvist and one film by Ingmar Bergman. Prerequisite, 221 or equivalent.

#### SWED

223, 224, 225 Swedish Conversation and Composition (2,2,2) A,W,Sp Beijbom

Prerequisites, 103 for 223; 223 for 224; 224 for 225.

#### SWED

300 Bellman and the Troubadour Tradition (3) À

#### Jarvi

Study of Bellman's poetry and its impact on Swedish vis-tradition. Prerequisite, 222 or equivalent.

#### SWED

SWED

### 301 Swedish Poetry After 1940 (3) W

Jarvi

Jarvi

A,W,Sp

Beijbom

Jarvi

equivalent.

SWED

SWED

350

Selection of poems by such poets as Karl Vennberg, Erik Lindegren, Werner Aspenström, Tomas Tranströmer, and Harry Martinson. Prerequisite, 300 or equivalent.

302 The Swedish Contemporary Novel (3) Sp

Selected works by Delblanc, Gyllensten, Sara

Lidman, and others. Prerequisite, 301 or

Conversation and Composition (2,2,2)

Third-year conversation and composition, based on readings in Swedish newspapers and

Contemporary Swedish Literature (3) A

Introduction to developments in Swedish lit-

journals. Prerequisite, 225 or equivalent.

303, 304, 305 Advanced Swedish

erature in the 1950s and 1960s through the study of representative poetry, prose, and dramas. Prerequisite, 222 or equivalent.

#### SWED

#### 352 Strindberg and His Works (3) Sp Jarvi

Representative short stories, dramas, autobiographical works, poems, and one novel. Prerequisite, 222 or equivalent.

#### SWED

#### 450 History of Swedish Literature (3) Sp Beijbom, Jarvi

A one-volume history serves as text. Representative literary works from the earliest times to the present are read to supplement the literary historical account and to show the evolution of the thought and form of the various genres. Prerequisite, 222 or equivalent.

#### SWED

#### 490 Supervised Reading (\*, max. 12) AWSp Beijbom, Jarvi

Students with an adequate reading knowledge of Swedish pursue in this course a program of study in a selected area of Swedish language, literature, or related fields. Conferences with the instructor; reports. Prerequisite, 302 or permission.

#### SCANDINAVIAN COURSES IN ENGLISH

#### SCAND

# 100 Introduction to Scandinavian Culture (2 or 21/2) AWSpS Beijbom, Conroy, Jarvi

Broad survey of the Scandinavian experience from the Viking age to the present day; the background for contemporary Scandinavian democracy, with major emphasis on the cul-tural, political, and religious development of the Scandinavian countries. 21/2 credits available Summer Quarter only.

#### SCAND

232 Hans Christian Andersen and the Literary Fairy Tale (3) Sp

Rossel, Sehmsdorf

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.

### SCAND

#### 309 The Icelandic Saga in Translation (2 or 21/2) SpS

Conroy Representative old Icelandic sagas in translation. 21/2 credits available Summer Quarter only.

#### SCAND

310 The Scandinavian Emigrant Novel (2 or 21/2)

Beijbom

The emigrant novel: Rölvaag, Bojer, Moberg. 21/2 credits available Summer Quarter only.

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#### SCAND

311 Modern Scandinavian Fiction in English (2 or 21/2) WS

#### Flatin, Jarvi, Rossel, Sehmsdorf

Representative novels and short stories of Jacobsen, Hamsun, Dinesen, Undset, and Lagerkvist. 21/2 credits available Summer Quarter only.

#### SCAND

330 Scandinavian Mythology (21/2 or 3) AS Sehmsdorf

Introduction to the study of the mythology of Germanic, and especially the Scandinavian, peoples. Emphasis on the source material, particularly the Poetic Edda and Prose Edda; also historical and archaeological material. 21/2 credits available Summer Ouarter only. (Formerly 230.)

# 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

Study of the Scandinavian folktale as oral literature and as expression of popular beliefs. (Formerly 231.)

#### SCAND

370 The Vikings (3)

Beijbom, Conroy, Flatin Study of the Vikings at home in Scandinavia and abroad with particular emphasis on their activities as revealed in archaeological finds and in historical and literary sources. Offered jointly with the Department of History as HSTEU 370

### SCAND

380 History of Scandinavia to 1521 (3) A Beiibom

Survey of Scandinavian history from the Viking age to 1521 with emphasis on the efforts at unification between Iceland, Denmark, Norway, and Sweden and their relationship to the European continent. Offered jointly with the Department of History as HSTEU 380.

#### SCAND

#### 381 History of Scandinavia to 1809 (3) W Beijbom

Survey of Scandinavian history from 1521 to 1809 with emphasis on the Lutheran Reformation, the Thirty Years War, and the Napo-leonic wars. Offered jointly with the Department of History as HSTEU 381.

#### SCAND

#### 382 History of Scandinavia From 1809 to the Present (3) Sp Beijbom

Survey of Scandinavian history from 1809 to the present with major emphasis on the political, social, cultural, and economic development of the Scandinavian countries. Offered jointly with the Department of History as **HSTEU 382.** 

#### SCAND

#### 389 Swedenborg and Mysticism (3) 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) A Conroy

Descriptive analysis of the phonological, morphological, and syntactical structures of the modern Scandinavian languages. Prerequisite, equivalent of two college years of a Scandinavian language.

#### SCAND

#### 460, 461 History of the Scandinavian Languages (3,3) W,Sp

Conroy

Survey of the development of the languages from primitive Scandinavian to contemporary Danish, Faroese, Icelandic, Norwegian, and Swedish. Prerequisite, two years of a Scandinavian language or permission.

### SCAND

480 Ibsen and His Major Plays in English (2 or 21/2) AS Jarvi, Steene

21/2 credits available Summer Quarter only.

#### SCAND

#### 481 Strindberg and His Major Plays in English (2 or 21/2) WS Jarvi. Steene

21/2 credits available Summer Quarter only.

#### **Courses for Graduates Only**

#### SCAND

500, 501, 502 Old Icelandic (3,3,3) A,W,Sp Conroy

#### SCAND

506 Ibsen's Early Plays (3) A Jarvi, Steene

(Offered alternate years; offered 1975-76.)

#### SCAND

#### 507 Ibsen's Later Plays (3) W Jarvi, Steene

(Offered alternate years; offered 1975-76.)

#### SCAND

508 The Nineteenth-Century Scandinavian Novel (3) A

Rossel, Sehmsdorf (Offered alternate years; offered 1974-75.)

### SCAND

509 The Twentieth-Century Scandinavian Novel (3) W

Rossel, Sehmsdorf

(Offered alternate years; offered 1974-75.)

#### SCAND

510, 511, 512 Strindberg (3,3,3) A,W,Sp Jarvi, Steene

(Offered alternate years; offered 1975-76.)

#### SCAND

519 Recent Scandinavian Drama (3) A Jarvi, Steene

Seminar on Scandinavian drama since Ibsen and Strindberg, Considers such playwrights as Par Lagerkvist, Stig Dagerman, Nordahl Grieg, Soya, Munk, and Kjeld Abel.

#### SCAND

#### 520 Modern Scandinavian Poetry (3) W Rossel

Seminar on the poetry from 1880 to 1930. (Offered alternate years; offered 1974-75.)

#### SCAND

521 Recent Scandinavian Poetry (3) Sp Rossel

Seminar on recent and contemporary poetry from 1930 to the present. (Offered alternate years; offered 1974-75.)

#### SCAND

523 Scandinavian Literature and Film (3) Sp Steene

Study of the film adaptations by Sjostrom and Stiller of the works of Selma Lagerlof; a consideration of the film adaptations by Carl Dreyer of such works as Kaj Munk's Ordet and Hj. Soderberg's Gertrud; an analysis of the relationship between Strindbergian dreamplay technique (and vision) and Ingmar Bergman's films. 260, 261 recommended, but not prerequisites.

#### SCAND

#### 524 Scandinavian Emigration: History and Literature (3) Sp Beilbom

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. (Offered alternate years; offered 1974-75.)

#### 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, Russian 203 or 210 or 250, or permission.

#### BULGR

#### 404, 405, 406 Advanced Bulgarian (5,5,5) A,W,Sp

Continuation of 401, 402, 403 to provide an introduction to Bulgarian literature, history, and culture through selected readings. These courses also reinforce and extend the student's basic knowledge of Bulgarian grammar and vocabulary through daily discussions in the language. Prerequisites, 403 for 404; 404 for 405; 405 for 406.

## CZECHOSLOVAKIAN

#### CZECH

401, 402, 403 Elementary Czech (5,5,5) A,W,Sp

401, 402: introduction to the essentials of spoken and written Czech. 403: modern Czech prose, leading to a command of the language as a research tool and providing an adequate basis for further study. Prerequisite, Russian 203 or 210 or 250, or permission.

#### CZECH

404, 405, 406 Advanced Czech (5,5,5) A,W,Sp Continuation of 401, 402, 403 to provide an introduction to Czech literature through selected readings from the main works of Czech authors of the nineteenth and twentieth centuries. The courses also reinforce and extend the student's basic knowledge of Czech grammar and vocabulary through daily discussions in the language. Prerequisites, 403 for 404; 404 for 405; 405 for 406.

#### HUNGARIAN

HUNGR 401, 402, 403 Elementary Hungarian (5,5,5) A,W,Sp

Introduction to spoken Hungarian pronunciation, basic grammar, 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

# ARTS AND SCIENCES

student's general vocabulary by the reading of short texts selected from Polish authors of the nineteenth and twentieth centuries. Prerequisite, Russian 203 or 210 or 250, or permission

#### 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.

#### ROMANIAN

#### ROMN

#### 401, 402, 403 Elementary Romanian (5,5,5) A,W,Sp

401, 402: comprehensive introduction to both spoken and literary Romanian. 403: designed to increase the student's vocabulary and enhance his knowledge of grammar through the reading of short fictional material in modern Romanian. Offered jointly with the Department of Romance Languages and Literature as Romanian 401, 402, 403.

#### ROMN

404, 405, 406 Advanced Romanian (5,5,5) A,W,Sp

Continuation of 401, 402, 403. Prerequisite, 403 or permission. Offered jointly with the Department of Romance Languages and Literature as Romanian 404, 405, 406.

#### RUSSIAN

#### RUSS

#### 101, 102 First-Year Russian (5,5) A,W

Introduction to Russian. Extensive oral practice to afford assimilation of basic structural features. Introduction to reading and composition. One hour weekly: lectures on pronunciation, grammar, and writing; opportunities for student questions (conducted in English). Four hours weekly: practice sessions conducted entirely in Russian. (See also 110.) For continuation, see 103.

#### RUSS

#### 103 First-Year Russian (5) Sp

Continuation of 101, 102. Prerequisite, 102 or 110, or permission.

#### RUSS

#### 110 Accelerated Russian (10) A

Covers material of 101, 102 in one quarter. Two hours weekly: lectures on pronunciation, grammar, and writing (conducted in English). Eight hours weekly: practice sessions conducted entirely in Russian. For continuation, see 115.

#### RUSS

#### 115 Accelerated Russian (10) W

Continuation of 110. Covers material of 103, 201 in one quarter. For continuation, see 210. Prerequisite, 110 or 102, or permission.

#### RUSS

150 Intensive First-Year Russian (15) S Covers material of 101, 102, 103 in one quarter. Recommended for students who want to acquire rapidly a considerable proficiency. For continuation, see 201 or 250, 202, 203.

#### RUSS

#### 201 Second-Year Russian (5) A

Sequel to 103. For continuation, see 202, 203. Prerequisite, 150 or 103, or permission.

# ARTS AND SCIENCES

#### 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 Ouarter 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 or 210, or permission.

#### RUSS

#### 306 Intermediate Russian Phonetics (3)

Systematic exploration and analysis of the Russian sound system, including phonetic tran-scription 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

#### 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

381 Phonetics in Leningrad (2 or 5) AWSpS Systematic exploration and analysis of the Russian sound system (with its phonetic transcription), including separate phonemes,

sound combinations, and modifications in normal speech as well as intonational patterns. Introductory discussions of pronunciation norms prepare the student for practical reading exercises, which represent the bulk of classwork. Special attention is given to correcting individual pronunciation errors. (2 credits are offered for the six-week Summer Quarter program, 5 credits for the fourteenweek semester program.) Prerequisite, 303.

#### RUSS

#### 382 Advanced Syntax and Composition in Leningrad (2 or 5) AWSpS

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 fourteenweek semester program.) Prerequisite, 303.

#### RUSS

#### 383 Conversation in Leningrad (4 or 6) AWSpS

Designed to increase active vocabulary, to further the student's control of idiomatic Russian, and to develop all the basic skills of oral expression. Every attempt is made to evoke spontaneous discussion about daily life, including excursions, lectures, and other parts of both the academic and cultural programs in Leningrad. (3 credits are offered for the sixweek Summer Quarter program. 6 credits for the fourteen-week semester program.) Prerequisite, 303.

#### RUSS

#### 384 Soviet Culture in Leningrad (4 or 6) AWSpS

Monograph lectures on major Soviet literary figures: two lectures per week on the life and writings of the week's author are followed by one seminar hour devoted to the analysis of texts for characteristic stylistic features and thematic concerns. Summer program has only lectures, 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. (3 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)

Russian prose translation from English to Russian, with emphasis on stylistics. Prerequisite, 403, or equivalent, or permission.

#### RUSS

#### 405 Advanced Russian Prose Composition (3)

Russian prose translation from English to Russian, with emphasis on idiom. Continuation of Russian 404. Prerequisite, 403, or equivalent, or permission.

#### RUSS

#### 406 Advanced Russian Prose Composition (3) Sp

Russian prose composition on topics of literary

or cultural interest. Continuation of 405. Prerequisite, 403, or equivalent, or permission.

#### RUSS

407 Advanced Russian Conversation (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.

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 Introduction to Russian Literature (5,5)

Gribanovsky, Konick

Discussion and analysis of Russian prose, poetry, and drama in Russian. Prerequisite, 303 or permission.

#### DIISS

#### 470 Special Topics in Russian for Teachers (Š) 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) Sp

Studies on various aspects of Russian literature, either in Russian or English, varying from quarter to quarter. Prospective students should consult the department office for information.

#### RUSS

#### 499 Undergraduate Research (3-5, max. 15) AWSp

For Slavic majors only. Prerequisite, permission.

### SERBO-CROATIAN

#### SER C

#### 401, 402, 403 Elementary Serbo-Croatian (5,5,5) A,W,Sp

Kapetanić

401, 402: comprehensive introduction to both spoken and written literary Serbo-Croatian. 403: designed to increase the student's vocabulary and enhance his knowledge of grammar through the reading of short stories in the modern literary idiom. Prerequisite, Russian 203 or 210 or 250, or permission.

# S

#### SER C

#### 404, 405, 406 Advanced Serbo-Croatian (5,5,5) A,W,Sp

Kapetanić 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. 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

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.

#### POLSH

**320** Polish Literature in English (5) A Survey of Polish literature, with emphasis on major trends and achievements.

#### RUSS

#### 320 Russian Literature in English (5) Introduction, from 1782 to the present. Representative prose and poetical works of the fore-

sentative 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)

Hagglund

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 Twentleth-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

**424** Pushkin and Gogol in English (5) Introduction to the works of A. S. Pushkin and N. V. Gogol in English.

#### RUSS

426 Goncharov and Turgenev in English (5) A

#### 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

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.

#### SER C

#### 320 Serbo-Croatian Literature in English (5) Sp

Survey of Serbian and Croatian literatures, with emphasis on major trends and achievements.

#### **Courses for Graduates Only**

# RUSSIAN

#### RUSS

512 Nineteenth-Century Russian Literary Criticism (4) A

Hagglund Analysis of the critical approach, methods, and literary values of major Russian literary critics of the nineteenth century.

#### RUSS

513 Contemporary Russian Literary Criticism (4) W

Recent trends in the Russian study of literature.

401

#### RUSS

#### 515 Russian Versification (4) Sp West

Russian versification and poetic language, with a brief survey of bibliography pertaining to Russian literary studies. Prerequisite, 526 or permission.

#### RUSS

**516** Stylistics of Modern Russian Poetry (4) Sp Examination of the linguistic aspects of poetic style in selected works of modern Russian poetry. Prerequisites, 451, 452, and 6 credits in Russian literature courses, or permission.

#### RUSS

520 Seminar on Russian Poetry (4) Sp

Topics in Russian poetry to be selected by the instructor.

### RUSS

522 Pushkin (4) A Analysis of the works of Alexander Pushkin.

#### RUSS

524 Nineteenth-Century Russian Poetry Since Pushkin (4) W

Discussion of the masters of nineteenth-century Russian lyric poetry since Pushkin.

#### RUSS

525 The Russian Symbolist Movement (4) Sp

Study of Russian poetry and prose of the symbolist period (1894-1910).

#### RUSS

526 Modern Russian Poetry (Acmeism and Futurism) (4) A

Study of Russian poetry in its renaissance, from 1890 to 1925. Prerequisite, 403 or equivalent.

#### RUSS

530 Seminar on Russian Prose (4) A

Examination and discussion of Russian masterpieces.

#### RUSS

532 Gogol (4) A Close analysis of Gogol's novels, plays, and stories in Russian.

#### RUSS -

533 Chekhov (4) A Detailed analysis of the plays and short stories of Anton Chekhov in Russian.

# RUSS

534 Dostoevsky (4) W Analysis of the works of Feeder

Boris Pasternak in Russian.

Literature (4) W

Analysis of the works of Feodor Dostoevsky.

Detailed analysis of the poetry and prose of

Examination of selected works of poetry, prose,

and criticism representative of Russian litera-

ture from 1917 to the present. Prerequisite,

Advanced Russian Morphophonology

Detailed discussion and evaluation of attempts

540 Seminar on Contemporary Russian

### RUSS

535 Tolstoy (4) W Analysis of the works of Leo Tolstoy.

#### RUSS 538 Pasternak (4) Sp

RUSS

RUSS

550

permission.

(3) A

Micklesen

to incorporate both Russian phonology and Russian morphology in modern scientific grammars. Prerequisite, 453.

#### RUSS

#### Advanced Russian Syntax (3) W 551 Micklesen

Detailed structural analysis of sentence types in the Russian literary language, with emphasis on grammatical categories and word classes.

#### RUSS

#### 555 History of the Russian Language (4) W Coats

Outline of grammatical and lexical develop-ments of the Russian literary language from the earliest documents to the present. Prerequisite, Slavic 550.

#### RUSS

#### Readings in the History of the Russian 556 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 (4) Sp

Discussion of representative works of poetry, prose, fiction, and criticism in the eighteenth, century. Prerequisite, 320 or permission.

#### RUSS

#### 575 Kievan Literature (4) W Hanev

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 (4) Sp Haney

Analysis of representative works of prose and poetry of the Muscovite period from the end of the thirteenth century to the reign of Peter I. Prerequisite, graduate standing. (Offered alternate years.)

#### RUSS

#### Russian Folk Literature (4) A 577 Hanev

Analysis of representative works of the various genres of folk literature including the byliny, skazki, historical and lyrical songs and the spiritual stikhi. Prerequisite, graduate standing. (Offered alternate years.)

#### RUSS

#### 578 Studies in Kievan Literature (4) W Hanev

Field course for students with a specialization in Kievan literature. Work with primary sources, textual tradition, and bibliography.

#### RUSS

#### Studies in Muscovite Literature (4) Sp 579 Hanev

Field course for students with a specialization in Muscovite literature. Work with primary sources, textual tradition, and bibliography.

#### RUSS

## 588-589-590 Russian Literature, 1750 to the Present (5-5-5) A,W,Sp

Survey of Russian Literature for first-year graduate students. Prerequisite, graduate standing.

#### RUSS

600 Independent Study or Research (\*) AWSp

# SLAVIC

#### SLAV

550 Historical Survey of Common Slavic (5)

#### Micklesen

Slavic languages and their geographical and dialectical distribution; Slavic civilization throughout prehistoric and early historic periods; principal phonological and morpholog-ical features of Slavic as a subgroup of the Indo-European family of languages. Prerequisite, Russian 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 lan-guages. 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 ofthography, 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 Russian 551.

#### SLAVIC LANGUAGES AND LITERATURE

SLAVC Independent Study or Research (\*) 600 AWSpS

# SLAVC 700 Master's Thesis (\*)

SLAVC

800 Doctoral Dissertation (\*)

# SOCIAL SCIENCE

#### SOC S

150 Afro-American History (5) Examination of the Negro and his role in history, both in Africa and the Americas.

# SOCIETY AND JUSTICE

#### SOJU

#### Non-Field Research in Society and 310 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 pri-

vate 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) AWSp8

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

Hargens, Miyamoto, Roberts Methods and sources for quantitative investigation. Prerequisite, 110.

# ARTS AND SCIENCES

#### SOC

#### 240 Introduction to Social Psychology (5) AWSn

Blumstein, Burgess, Cook, Emerson Socialization of the individual; social processes; and interactions of persons in groups. Prerequisites, 110 and Psychology 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)

Kinds of deviant behavior and the issues covered are of interest in themselves, but the course is especially recommended for sociology majors and those who plan to take courses in criminology, delinquency, or corrections. Focuses on drug use (opiate addiction, hallucinogenic and other drug use), sexual deviance, alcoholism, suicide, mental illness, crime, and delinquency. Description, theory, research, and policy issues of law and control relevant to understanding deviance are presented and discussed. Prerequisite, 110.

### SOC

#### 330 Human Ecology (5) A

Campbell

Factors and forces that determine the distribution of people and institutions. Prerequisite, 110.

#### SOC

#### **Population Analysis (5)** 331

Campbell, Guest, McCann 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

#### Socialization (5) 347

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; disorgani-zation and reorganization. Prerequisite, 110.

#### 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, economio, and political structures. The relationship between age, sex, and other bases of social inequality. Prerequisite, 110.

#### SOC

#### 362 Race Relations (5) AWSp

Barth, Black, Miyamoto, van den Berghe Interracial contacts and conflicts. Prerequisite, 110.

#### SOC

365 Urban Community (5)

Barth, Bose, Guest Comparative and analytic study of organization and activities of urban groups. Prerequisite, 110.

#### SOC

#### 371 Criminology (5) AWSp Schrag

Factors associated with crime and delinquency. Criminological theories. Survey of correctional facilities and programs. Visits to agencies and institutions. Prerequisite, 110.

#### SOC

#### Reading in Selected Fields (2-5, max. 15) 389 AWSp

Open only to qualified undergraduate students by permission.

#### SOC

#### History of Sociological Thought (5) 410 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; Ger-

man sociology; Marx, Weber, and Simmel.

#### SOC

#### **Theory Construction (5)** 414

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

#### Methods of Sociological Research (5) 420 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 re-search 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

Application of statistical methods to the analysis of sociological data.

### SOC

#### 426 **Methodology: Quantitative Techniques in** Sociology (3)

## Hargens

Measures of relationships among variables and among attributes; calculation techniques; application to typical sociological problems; interpretation. Prerequisite, 223 or 424.

#### SOC

#### Statistical Classification and 427 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

#### 440 **Primary Interaction and Personal** Behavior (5)

Mivamoto

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)**

The nature of public opinion; formation and measurement of public opinion; the operation of public opinion polls. Prerequisite, 240 or equivalent.

#### SOC

#### 443 **Mass Communication (5)** Larsen

Control, structure, and functioning of mass

Burgess, Roberts

# ARTS AND SCIENCES

media of communications as a force in social life; methods of research. Prerequisite, 240 or equivalent.

#### SOC

#### 445 Social Movements (3) Miyamoto

Social movements as collective enterprises to establish new social orders; types, formation, and organization of movements. Prerequisite, 240 or equivalent.

### SOC

#### 448 Sociometric Analysis and Group Structure (5)

Roberts

Analysis of the theory and techniques used in the description and experimental investigation of group structure and process. Study of formation, organization, cohesion, and disorganization of social groups through sociometric techniques. Prerequisites, 223, 240, and senior standing.

#### SOC

#### 450 Contemporary American Institutions (5) Guest, Hechter, Wager

Origins and developments of major social institutions. Sociology of economic structure, political organization, religion, education, recreation, and other institutionalized patterns. Prerequisite, 110.

#### SOC

#### 451 Social Change and Trends (5) Hechter, Wager

Basic trends in American life; frames of reference for analysis of social change; forces causing social change. Prerequisite, 15 credits in social science.

#### SOC

#### 452 Health and Social Behavior (5) Sharp

Theoretical and methodological aspects of health, disease, and illness as deviant behavior in relation to social (organizational and occupational), ecological, demographic, and cultural determinants of health and health care. Prerequisite, 110.

#### SOC

### 453 Social Factors in the Family (3)

Review and analysis of empirical research in courtship and marriage, marital adjustment, and specific areas of marriage and family life. Prerequisites, 223 and 352.

#### SOC

#### 456 Political Sociology (3) Roth

Bases of political legitimacy; modern and traditional structures of domination: theories of democracy, authoritarianism, and totalitarianism; relationship to social classes, status groups, and economic organization. Prerequisite, 110.

#### SOC

#### 457 Sociology of Religion (5) Roth

The relations between religion, polity, economy, and social structure; in particular, the political, economic, and social impact of religious beliefs and organizations, as well as the social determination of these beliefs and organizations; the rise of secularism, the rationalization of modern life, and the emergence of political quasi religions.

#### SOC

**458** Institutional Forms and Processes (3) Process of institutionalization and the general nature of institutions; relationship of institutions to persons; institutions and social control; social change and institutional disorganization. Prerequisites, 110 and upper-division standing.

#### SOC

#### 459 Comparative Social Systems: Africa (3) van den 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, Hargens

Analysis of societal organization based on sex, age, residence, occupation, community, class, caste, and race. Prerequisite, 110.

#### SOC

#### 463 American Negro Community (3) • Barth

Internal structure of class and caste patterns; resultant personality and institutional development. Prerequisite, 110.

#### SOC

#### 465 Complex Organizations (3) Gross

Examination of the structure of complex organizations. Particular attention is given to developing generalizations applicable to industrial organizations, businesses, hospitals, prisons, labor unions, governments, universities, armies, and similar formally instituted organizations. The major focus is on empirical research, with some attention to methodological problems in studying such organizations. Prerequisite, 15 credits in sociology.

#### SOC

### 466 Industrial Sociology (5)

Changing focus of field; contrasting types of industrial organizations; industrial organizations as social systems; problems of social systems; the individual in the organization; union-management relations and organizational dynamics. Prerequisite, 110.

#### SOC

# 467 Industry and the Community (3)

Nature of the economy. Theories of industry-community relations. Varieties and types of relations between industry and community. Process of power. Impact of technological change. Levels of worker participation in the community. Integration of industry and other communal institutions. Prerequisite, 110.

#### SOC

#### 468 Sociology of Occupations and Professions (5) 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

#### 472 Juvenile Delinquency (5) Costner

Factors in delinquency, juvenile courts. Programs of treatment and prevention. Prerequisite, 371 or equivalent.

#### SOC

#### 473 Corrections (5) Schrag

Social control of crime. Police, courts, institutions, and correctional agencies for adult offenders. Individual 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. Prerequisite, permission.

#### SOC

#### 496H, 497H, 498H Senior Seminar (3,3,3) 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 Research (2-5, max. 15) AWSp

Open only to qualified undergraduate students by permission.

#### 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** Theories in Social Psychology (3) A Broad graduate-level introduction to the theories in the field of social psychology.

#### SOC

#### 515 Current Research in Social Psychology (3) W

Broad graduate-level introduction to the research in the field of social psychology.

#### SOC

# 516 Organizations (3) Sp

Cook, Gross

Broad graduate-level introduction to the theory and research on complex organizations.

#### **Deviance and Social Control (3) Sp** Schrag

Survey of current research on deviant behavior and mechanisms of social control; definitions and forms of deviant behavior; causal analysis, and legal or other methods of social control. Prerequisite, graduate standing.

# SOC

#### 518 Social Stratifications (3) W Hargens, Stark

Intensive preparation in theoretical, 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 (re-cursive 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

Seminar on Selected Statistical Problems 528 in Social Research (3) Costner

Prerequisite, 426.

#### SOC

### 530 Advanced Human Ecology (3)

Prerequisites, 330 or 430, and 15 credits in social sciences.

#### SOC

# 531 Demography (3)

Research problems in population and vital statistics. Prerequisites, 331 or 431 and 15 credits in social sciences, or permission.

#### SOC

532 Research Methods in Human Ecology (3) Analysis of community structure, segregation, and other spatial phenomena. Measures of 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

Selected Topics in Demography and 539 Ecology (3, max. 9)

Specialized problems in demography or ecology are covered; for example, migration, fertility, mortality, language, race and ethnic relations, metropolitan community. See quarterly announcement for specific problem to be covered. Prerequisite, permission.

#### SOC

540, 541 Seminar on Social Interaction (3,3) Burgess, 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. Prerequisite, 440.

#### SOC

#### 542 Seminar on Small Group Research (3) Cook

Theories, methodology, and studies in the area of small-group research. Covers such topics as interaction channels, group cohesion, group locomotion, and consensus in groups. Prerequisite, permission for nonmajors.

#### SOC

#### **Communications Seminar (3)** 543 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

#### Seminar on Social Power (3) 544 Emerson

Examination of basic principles concerning power, influence, and authority in small groups, organizations, and communities. Prerequisites, 240, 415, and 460.

#### SOC

#### Methods of Experimental Analysis in 545 Social Research (3)

Burgess, Schmitt Application of the method of experimental analysis to problems in sociology and social psychology.

#### SOC

#### 550, 551, 552 Marriage and the Family (3,3,3) Schwartz

Analysis of marriage and family patterns and problems, with initial emphasis on research findings and methods. Individual research on selected projects. Prerequisites, 352 and 453, or equivalents.

#### SOC

#### 562 **Seminar 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 on 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 the Department of Anthropology as ANTH 569. Prerequisite, graduate standing in a social science department.

#### SOC

#### 571 **Correctional Communities (3)** Schrag

Prisons and juvenile reformatories as 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 (\*) AWSD

SOC

700 Master's Thesis (\*) AWSp

SOC

800 Doctoral Dissertation (\*)

### SPEECH

#### GENERAL

#### **Courses for Undergraduates**

#### SPCH

#### Voice and Articulation Improvement (3) 100 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.

#### SPCH

#### 101 Applied Phonetics (2) AWSp

Continuation of 100 for students with special concerns in the area of pronunciation and articulation. Not open to those who have had 300 or 302. Prerequisite, 100 or permission.

# ARTS AND SCIENCES

# ARTS AND SCIENCES

#### SPCH

Speech, the Individual, and Society 102 (5) AWSp

Introduction to the study of speech communication, the semantic and physical bases of speech, speech in the life of the individual and society, the impeding and facilitating of com-munication.

# SPCH

#### 103 Basic Principles of Oral Communication (5) AWSp

Training in interpersonal communication. Emphasizes analyzing and experiencing communication variables affecting human relationships, such as person perception, feedback, idea development, nonverbal cues, etc. Emphasis is on informal communication settings.

#### SPCH

#### 111 Standard and Nonstandard American Speech: Theory and Applications (2) AWSp

A wide variety of American speech patterns or dialects is studied in terms of their phonetic, phonological, sociolinguistic, and psycholinguistic characteristics. Study of standard and nonstandard American speech patterns is sup-plemented 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, permis-. sion.

#### SPCH

#### 203 Principles of Oral Communication (3) AWSp

Fundamentals of interpersonal communication designed to develop the elementary and secondary teacher's ability to communicate sensitively and effectively in an educational setting, Required for the Provisional Teaching Certificate. 103 may be substituted, but credit may not be received for both 103 and 203.

#### SPCH

#### 308 Humanistic Approaches to Interpersonal Communication (5) W

Stewart Intermediate-level course that explores several humanistic approaches to interpersonal speech communication, emphasizing the theorists' philosophical orientations.

#### SPCH

#### 368 Small Group Facilitation (3) AWSp Nyquist

Study of methods for facilitating discussion in small groups formed for the purposes of instruction. Examines theoretical principles of group communication and group thought-line development. Considers both the cognitive goals and processes 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

400 Theoretical Backgrounds in Speech (3) W Nilsen

Speech as a form of individual and social behavior, with an emphasis on the function of symbols in human interaction.

#### SPCH

499 Undergraduate Research (1-5, max. 15)

AWSD Prerequisite, permission.

### **Courses for Graduates Only**

#### SPCH

501 Introduction to Graduate Research in Speech (3) A

#### SPCH

590 Seminar on Theory of Speech (2, max. 6) A

#### SPCH

600 Independent Study or Research (\*) AWSp

#### SPCH

700 Master's Thesis (\*) AWSp

# SPCH

800 Doctoral Dissertation (\*)

#### **RHETORIC AND PUBLIC ADDRESS**

#### **Courses for Undergraduates**

#### SPCH

#### 220 Introduction to Public Speaking (5) AWSp

Campbell

Beginning course in persuasive speaking emphasizing choice and organization of material, sound reasoning, audience analysis, oral style, and delivery. Frequent speeches before the class, followed by conferences with in-structor. Not open to students who earned credit for 120 prior to Autumn Quarter 1961. Special section for honors students offered Autumn Quarter only.

#### SPCH

#### 222 Speech in a Free Society (3) W Bosmaiian

Examination of problems and arguments related to freedom of speech; early English writers on freedom of expression; background of freedom of speech in the United States; contemporary freedom of speech issues.

#### SPCH

#### 235 Parliamentary Procedure (3) A Bosmajian

Principles and practice: a study of the historical bases and contemporary uses of parliamentary procedure; methods and practice in organizing. and conducting public meetings.

#### SPCH

#### 305 Perspectives on Language in Speech Communication (5) W Stewart

Introduction to the study of language and meaning, and survey of three influential modern approaches: the semantic-general semantic, behavioral, and analytic philosophical. Relates theories of language and meaning to the study of speech communication.

#### 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, 103 or 220, or permission.

#### SPCH

# 327 Extempore Speaking (3) Sp

Not open to speech majors or students who have taken 220 or 320.

#### SPCH

#### 329 Rhetoric of Social and Political Movements (5) Sp

Inquiry into the rhetoric of social and political movements; emphasis on investigation of persuasive discourse; also an examination of the nonverbal symbols of persuasion.

#### SPCH

# 334 Essentials of Argument (5) AWSp Douglas, Stephenson

Argument as a technique in the investigation of social problems; evidence, proof, refutation, persuasion; training in argumentative speaking.

#### SPCH

#### 335 Methods of Debate (3) W Douglas

Introduction to debate as a method of advocacy with study and practice of its more important forms. Concurrent registration in 339 not permitted. Prerequisite, 220 or 334, or permission.

#### SPCH

#### 339 Forensic Studies (1-3, max. 9) AWSp Douglas

Discussion of selected public questions before audiences on and off campus. No more than 3 credits may be earned in one year, and these should normally be distributed through at least two consecutive quarters. The student should confer with the Director before completing registration. Prerequisite, permission.

#### SPCH

373' Principles of Group Discussion (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 334, or permission.

#### SPCH

#### 421 Advanced Speech Composition (5) W Baskerville

Preparation and delivery of longer public speeches. Emphasis on style, thought organization, and proof. Analysis of model speeches. Prerequisite, 220 or permission.

#### SPCH

#### 424 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, 426 American Public Address (5,5) A,Sp Baskerville

Historical and critical study of principal speakers and speeches and of their relationship

to American political, social, and intellectual life. A lecture, discussion, and reading course. 425: revolutionary period to late nineteenth century; 426: late nineteenth century to the present.

# SPCH

#### 428 British Public Address (5) W Campbell

Historical and critical study of principal speakers and speeches and of their relationship to British political and social life. Rhetorical analysis of speeches.

#### SPCH

473 Problems of Discussion Leadership (3) Sp Critical analysis of leadership in committee and conference, with emphasis on the development of speech effectiveness in the cooperative achievement of goals. Prerequisite, 373.

#### **Courses for Graduates Only**

#### SPCH

# 521 Studies in Greek and Roman Rhetoric (5)

Critical analysis of writings on rhetoric by Plato, Aristotle, Cicero, Quintilian, and others.

#### SPCH

#### 522 Studies in Medieval and Renaissance Rhetoric (5) W

Critical analysis of selected persons, works and topics related to the development of rhetorical theory during the Middle Ages and the Renaissance. Prerequisite, 521. (Offered alternate years; offered 1975-76.)

### SPCH

#### 523 Studies in Modern Rhetoric (5) W Campbell

Critical analysis of writings on rhetoric by Cox, Wilson, Bacon, Campbell, Blair, Whately, and others.

## SPCH

#### 524 Studies in Contemporary Rhetoric (5) Sp Nilsen

Critical analysis of recent developments in, and contributions to, rhetorical thought.

#### SPCH

#### 525 Rhetorical Criticism (5) W

Baskerville History and method of rhetorical criticism. Application of critical standards to notable British and American speeches. Prerequisite, 425 or 426 or 428.

#### SPCH

592 Seminar in Rhetoric and Public Address (2, max. 6) W

#### SPCH

Seminar in Argument and Discussion 593 (2, max. 6) Sp

#### **ORAL INTERPRETATION** OF LITERATURE

# **Courses for Undergraduates**

#### SPCH

#### 140 Oral Interpretation of Literature (5) AWSp Weybright

Introduction to the study of imaginative literature through the medium of oral performance. Analysis and interpretation of verse, prose, and drama.

#### SPCH

#### 240 Critical Approaches to Oral Interpretation (3) W

Relating oral interpretation performance and literary criticism. Critical study and performance of contemporary verse, prose, and drama. Prerequisite, 140.

#### SPCH

345 Ensemble Oral Interpretation (3) Sp Potentials for ensemble oral interpretation in the three major genres of imaginative works of literature. It includes study in the theory and techniques of Chamber Theatre and Readers Theatre. Prerequisite, 140. (Offered alternate years; offered 1975-76.)

#### SPCH

#### 347 **Oral Interpretation of Nonfiction Prose** (3) Sp

Study of stylistic, literary, and rhetorical strategies in nonfiction prose texts from the point of view of the oral interpreter. Materials are selected from histories, biographies, autobiographies, speeches, essays, travel literature, letters, journals, and diaries. Prerequisite, 140. (Offered alternate years; offered 1974-75.)

#### SPCH

#### 349 Readers Theatre (2, max, 10) AWSp Post

Preparation and public presentation of programs of literary works. Prerequisites, 140 and permission.

#### SPCH

440 Oral Interpretation of Poetry (3) W Study of forms of verse through analysis and oral presentation. Prerequisite, 140.

#### SPCH

442 Oral Interpretation of Fiction (3) A Analysis 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.

#### **Courses for Graduates Only**

## SPCH

540 History of Oral Interpretation (3) A Critical analysis of writings by Sheridan, Walker, Rush, Delsarte, Bell, Curry, Emerson, and others. (Offered alternate years; offered 1975-76.)

## SPCH

#### 543 Studies in Theories of Performance and Criticism (3) W

Analysis of performance theories as expressed in the writings of oral interpreters and literary critics.

#### SPCH

594 Seminar in Oral Interpretation (2, max. 6) Sn

#### SPEECH-COMMUNICATION SCIENCE

#### **Courses for Undergraduates**

#### SPCH

#### 270 Introduction to Speech-Communication Science (5) A

D'Angelo, Stephenson

Basic research principles in speech-communication science; survey of substantive research findings. Prerequisite, 103.

#### SPCH

471 Persuasion (3) Sp Arundale, D'Angelo

Analysis of the ways in which beliefs, values, attitudes, and behavior are deliberately influenced through communication.

#### SPCH

- 472 Speech Communication and
- Interpersonal Influence (5) W Arundale, D'Angelo

Examination of major theoretic positions and empirical research findings in current speech communication literature on interpersonal influence. Emphasis on the insights that such theory and research provides on human speechcommunication behavior in common interpersonal situations.

#### SPCH

#### 476 Speech Communication: Behavioral Models and Theories (4) Sp

Arundale, Stephenson

Examination of selected theories and models of speech communication from the behavioral sciences, as well as of criteria applicable to them. Emphasis on the nature and function of theories and models, especially as these relate to basic principles underlying the scientific study of speech communication phenomena.

#### **Courses for Graduates Only**

#### SPCH

576 **Experimental Methods in Speech Communication (3) Sp** 

D'Angelo, Stephenson

Application of behavioral research principles to problems in quantification, design, and analysis of data in speech-communication research. Prerequisite, introductory statistics or equivalent, or permission.

#### SPCH

577-578 Research Problems in Speech Communication (3, max. 6)-(3, max. 6)

W.Sn

Application of methodology and design principles to research problems in speech communication. Prerequisite, 577- for -578.

#### SPCH

Seminar in Interpersonal 597

Communication (2, max. 6) ASp Examination of experimental literature on selected topics. Subject to change from year to year, including conflict resolution, information processing, communication networks, feedback systems, audience composition research, communication effects. Prerequisite, permission.

## SPEECH PEDAGOGY

#### **Courses for Undergraduates**

#### SPCH

#### 455 Communication in Children's Environments (4) W

Booth

Designed to develop understanding of speech communication as both process and substance of formal and informal learning. Includes study of the teacher's transactions with children, parents, colleagues, and administrators; the communication between adults and children in informal settings; and the child's language and speech growth during the preschool to middle school years. Appropriate for all teachers, teacher aides, and other educational staff.

#### SPCH

#### 456 Communication in Youth Environments (4) W

Booth, Nyquist

Designed to develop understanding of speech communication as both process and substance of formal and informal learning. Includes study of the teacher's transactions with youth, parents, colleagues, and administrators; the communication between adults and youth in informal settings; and youth communication needs during the middle school to college years. Appropriate for teachers of all subjects, teacher aides, and other educational staff.

#### SPCH

#### 457 Debate and Discussion Problems in High School and College (21/2) S

Douglas

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.

#### **Courses for Graduates Only**

#### SPCH

#### 550 Problems and Methods in Speech Pedagogy (3) A

Philosophical, curricular, and methodological problems of speech instruction. (Offered alternate years; offered 1974-75.)

#### SPCH

595 Seminar in Speech Pedagogy (2, max. 6) Sp

# SPEECH AND HEARING SCIENCES

### **Courses for Undergraduates**

#### SPCH

300 Speech Science (5) AWSp

Study of the basic physiological and acoustical attributes of speech production and reception.

#### SPCH

#### 301 Anatomy of the Speech Mechanism (5) AWSp Palmer

Structure and function of the organs concerned with phonation and articulation. Class size limited.

### SPCH

#### 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.

#### SPCH

#### 303 Speech and Language Development (3) ASp

Study of the normal acquisition of speech and language in children. Prerequisite, 302 or permission.

#### SPCH

304 Physical Dimensions of Speech (2) AWSp Basic introduction to physical characteristics of the speech signal. Emphasis is given to properties of vibratory systems, analysis and measurement of speech waveforms, and physical correlates of the perceptual attributes of speech sounds. Not open to those who have had 300, except by permission. Lectures complemented by laboratory demonstrations and projects.

#### SPCH

#### 402 Advanced Phonetic Analysis (2) WSp Tiffany

Advanced transcriptional and feature analysis of abnormal and nonstandard speech patterns. Prerequisite, 302 or equivalent introductory phonetics course by permission.

#### SPCH

#### 414 Speech Physiology (3) A

#### Abbs, Bennett

Study of the physiological parameters of speech production. Prerequisite, 300, 302 or permission.

#### SPCH

#### 415 Speech Acoustics (3) W Minifie, Tiffany

Study of the acoustical correlates of the distinctive parameters of speech. Special emphasis on speech analysis methods, including sound spectrography. Prerequisite, a course in speech science or phonetics, or permission.

#### SPCH

#### 416 Speech Perception (3) Sp

Bennett Study of the perceptual and linguistic parameters of speech perception. Prerequisites, 300, 302, or permission.

#### SPCH

#### 420 Instrumentation for Speech and Hearing Science (3) A

General problems in design and application of electronic equipment used in the speech and hearing sciences. Laboratory problems and demonstrations; two hours of laboratory required each week.

#### **Courses for Graduates Only**

#### SPCH

#### 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.

#### SPCH

#### 503 Experimental Phonetics (3, max. 9) Sp Tiffany

Application of experimental methods to re-

search in voice and phonetics; critical review of research literature.

#### SPCH

#### 504, 505 Research Methods in Speech and Hearing Science (3,3) W,Sp Prather, Thompson

504: introduction to empirical methods in the speech and hearing sciences. 505: applications of basic statistical procedures to investigation of specific problems in the communication sciences. Prerequisite for 505, Psychology 302 or equivalent.

#### SPCH

519 Seminar in Speech Science (2, max. 6) AWSp

#### SPCH

#### 520 Advanced Instrumentation for Speech and Hearing Science (3) Sp

Design and use of electronic and electroacoustic devices in the speech and hearing sciences. Laboratory construction and calibration of equipment. Two hours of laboratory required each week. Prerequisite, 420. (Offered alternate years; offered 1974-75.)

#### SPEECH AND LANGUAGE DISORDERS

#### **Courses for Undergraduates**

#### SPCH

250 Introduction to Communication Disorders (3) ASp

Orients the student to the field of communication disorders and to a basic classification system. Required of all students majoring in speech pathology.

#### SPCH

#### 330 Disorders of Articulation (3) ASp

Nature, etiology, and treatment. Prerequisites, 250, 302, and 303.

#### SPCH

331 Language Disorders of Children (3) W Consideration of descriptions and theories, both historical and contemporary, of disordered language in children and related problems. Prerequisites, 250 and 303.

#### SPCH

332 Diagnosis of Speech Disorders (3) ASp Prerequisites, 330 and 331.

#### SPCH

#### 348 Survey of Communication Disorders (3) Sp

For students not intending to major in speech pathology or audiology.

#### SPCH

350 Methods of Clinical Management (3) AWSp

#### Miner

Techniques and procedures for planning effective management of speech disorders. Prerequisites, 380 or 331 and 332; 332 may be taken concurrently.

#### SPCH

351 Practicum in Speech Pathology (1-2, max. 15) AWSp

Miner

Total undergraduate credits in 351 and 391 together cannot exceed 20 credits. Minimum of 3 credits recommended. Prerequisites, 332, 350, and permission.

# S

#### SPCH

#### 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.

#### SPCH

#### 432 Interview Techniques for Communication Disorders (2) ASp

Interview techniques for the management of communication disorders. Prerequisites, 250 and junior standing.

#### SPCH

#### 449 Special Studies in Speech Pathology and Audiology (1-5, max. 15)

Intensive study of selected special problems in speech pathology and audiology. Prerequisite, permission.

#### SPCH

#### 450 Treatment of Stuttering (3) W 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.

#### SPCH

#### 451 Speech Pathology-Audiology Practicum in the Schools (1-2) AWSp

Miner, Wilson

Special projects in clinical practicum, offered only in the school setting. Provides an opportunity for students to extend practicum experiences in this special environment; does not fulfill requirements for teaching practicum in the College of Education. Prerequisites, 350 and permission.

#### SPCH

#### 452 Rehabilitation Medicine Information in Speech Pathology (3) A

Orientation information for speech pathology and audiology students on rehabilitation principles and techniques. Offered jointly with the Department of Rehabilitation Medicine as Rehabilitation Medicine 479. Lecture and clinical observation in all areas of rehabilitation, emphasizing cooperation and coordination of various professions in rehabilitation.

#### SPCH

#### 454 Voice Disorders (3) W

Etiology, evaluation, and treatment. Prerequisites, 250 and 301.

### **Courses for Graduates Only**

#### SPCH

### 530, 531, 532 Organic Disorders of Speech (3,3,3) A,W,Sp

Etiology, evaluation, and treatment. 530: morphogenic disorders, especially cleft palate and dental malocclusions. 531: dysarthria, especially cerebral palsy. 532: dysphasia. Prerequisite for each course, 330 or permission.

#### SPCH

535 Psychological Factors in Communication Disorders (2) W

# Prerequisite, Psychology 305 or permission.

#### SPCH

# 536 Advanced Diagnostic Procedures in

Speech Pathology (4) AWSp Study of approaches to differential diagnosis in speech and language disorders, as well as experience in the integration of information gained from various diagnostic procedures. Two hours of laboratory required per week. Class size limited. Prerequisites, 332 and permission.

### SPCH

#### 551 Advanced Practicum in Speech Pathology (1-3, max. 10) AWSp Miner

Prerequisites, 351 or equivalent and permission.

#### SPCH

#### 552 Clinical Management of Stuttering (3) W 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.

#### SPCH

#### 560 Research Methods in Clinical Management of Childhood Language Disorders (3) AWSp

Rationale and methods for systematic sampling, data collection, and data analysis are applied to the evaluation and the modification of language behaviors. Each student designs, conducts, and reports on a laboratory project applying research methods to the evaluation of some aspect of a child's language behavior. Class size limited. Prerequisites, 303 and permission.

#### SPCH

#### 561 Language of Normal Children (3) AWSp Carpenter

Advanced study of language acquisition and use by normal children, with emphasis on behavioral, semantic, grammatical, and syntactic aspects. Tools employed in study of early language development are presented. Two hours of laboratory required each week. Class size limited. Prerequisites, 303 and 560 or equivalent, and permission.

#### SPCH

#### 562 Evaluation of Language Disorders of Children (4) AWSp

Procedures and tools used in evaluating the language skills of children are presented along with parent interviewing techniques and professional reporting methods. Three hours of practicum each week in an interdisciplinary clinic are required. Class size limited. Prerequisites, 331 and 561, and permission.

# SPCH

#### 563 Management of Language Disorders of Children (3) AWSp

Methodology appropriate to individual and small-group management with children having language disorders, with emphasis on a behavioral approach. Two hours of practicum required each week. Class size limited. Prerequisites, 331 and 561, and permission.

SPCH

#### 564 Classroom Management of Language Behaviors (2-5) AWSp Rieke

Methodology and supervised experience in management of language behaviors in a preschool class setting. Class size limited. Prerequisites, 563 and permission.

#### SPCH

#### 565 Practicum in Language Disorders of Children (1-3, max. 15) AWSp

Prerequisites, 563 or equivalent, and permission.

#### SPCH

 566 Seminar on Language Development and Disorders (2, max. 6) S
 Prerequisites, 331 and 477.

### SPCH

#### 569 Seminar on Speech Pathology (2, max. 6) Sp

Disorders of speech and language associated with psychopathologies in children and adults.

#### AUDIOLOGY

### **Courses for Undergraduates**

#### SPCH

**306** Introduction to Audiology (5) ASp Description of normal audition; elementary structure and function of the hearing mechanism; types of deficient hearing and their effects on speech. Prerequisites, 301 and 304.

#### SPCH

#### 371 Basic Audiometry (5) AWSp

Introduction to the theory and practice of the assessment of hearing function. Two hours of laboratory required each week. Class size limited. Prerequisites, 306 and permission.

#### SPCH

# 390 Introduction to Aural Rehabilitation (5)

Wilson

Psychological and educational implications of hearing loss; principles and methods of speech reading, auditory training, and speech conservation. Prerequisite, 306.

#### SPCH

#### 391 Practicum in Audiology (1-2, max. 15) AWSp

#### Wilson

Total undergraduate credits in 351 and 391 together cannot exceed 20 credits. Minimum of 2 credits recommended; may be repeated for credit. Prerequisites, 371 or 390, and permission.

#### SPCH

#### 477 Pediatric Audiology (3) W

Assessment of auditory disorders in infants and young children. Emphasis on behavioral and electrophysiologic techniques and on the role of the audiologist in the clinical management of the young hearing-impaired child. Prerequisites, 306 and 371, or permission.

#### SPCH

#### 493 Acoustic Amplification (3) W

Study of acoustic amplification and pertinent audiologic techniques. Prerequisites, 371 and 390, or permission.

#### SPCH

#### 494 Hearing Conservation for Children (2) Sp Wilson

Planning and execution of identification and educational programs relative to hearingimpaired infants and children of preschool and school ages. Prerequisites, 371 and 390, which may be taken concurrently.

# ARTS AND SCIENCES

### **Courses for Graduates Only**

#### SPCH

526 Physiological Acoustics (3) W Yantis

Study of pertinent literature and experimental techniques incident to the scientific study of the normal and abnormal auditory system.

#### SPCH

527 Psychoacoustics (3) Sp Yantis

Review of instrumentation, research techniques, and significant literature pertinent to normal auditory sensitivity, pitch, loudness, and other attributes of auditory sensation. (Offered alternate years; offered 1975-76.)

#### SPCH

### 570 Advanced Audiology (5) A

Methods, techniques, and instruments used in the measurement of auditory function. Review of research literature. Prerequisite, 371 or permission.

#### SPCH

#### 571, 572, 573 Advanced Audiometry (3,3,3) A,W,Sp

Special diagnostic and predictive techniques for assessment of auditory function. 571: techniques of objective audiometry and evaluation of nonorganic hearing problems. 572: func-tional evaluation of the cochlear end organ. 573: functional evaluation of the retrocochlear and central auditory systems. Prerequisite for each course, 570.

#### SPCH

#### Industrial and Community Hearing 574 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 or permission. (Offered alternate years; offered 1974-75.)

#### SPCH

#### 575 Medical Background for Audiology (2) W Snvder

Diseases and injuries of the ear resulting in reduced audition. Prerequisite, 306 or permission. (Offered alternate years; offered 1973-74.)

#### SPCH

#### 591 Advanced Practicum in Audiology (1-3, max. 10) AWSp

Wilson

Prerequisites, 391 or equivalent, 570, and permission.

#### SPCH

#### 596 Advanced Aural Rehabilitation (5) Sp Wilson

Survey and study of the pertinent research literature in speech reading, auditory training, and speech conservation for the auditorially handicapped. Prerequisite, 390 or permission.

#### SPCH

599 Seminar on Audiology (2, max. 6) W Audiologic implicatons of middle-ear impedance, tympanometry, and the acoustic reflex.

# 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. Pre-requisite, 118 concurrently.

#### 200L

#### 208 Elementary Human Physiology (5) Sp Griffiths

Each organ system is described and its function illustrated in the laboratory. Credit is not given for 208 if credit has previously been given for 118. Prerequisites, two quarters of college chemistry, two quarters of college biological sciences completed or in progress.

#### ZOOL

301 Introductory Physiology (3) Olsen, Riddiford, Truman

Fundamentals of physiology: biochemistry of cell constituents, environment of the cell, bioenergetics, intermediary metabolism, membranes, control mechanisms. Prerequisites, chemistry through organic, one year of college physics, 10 credits in biological sciences.

#### ZOOL

#### 330 Natural History of Marine Invertebrates (5) SpS

Kohn, 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 Field and laboratory course on the classifica-

tion, ecology, and behavior of fishes, amphibians, reptiles, birds, and mammals. Students may be required to share a portion of the transportation costs of field trips. Prerequisite, permission.

#### ZOOL

#### 402 History of Zoology (3)

Prerequisite, 20 credits in zoology or permission.

#### 200L

#### 403 Comparative Vertebrate Histology (5) A Cloney

Microscopic and submicroscopic anatomy of the tissues and organs of vertebrates. Prerequisite, Biology 212.

#### ZOOL

#### 409 Ethology (3) W Orians, Palka

Perception, nervous integration, movement, motivation, instinct, learning, and social behavior in animals, with emphasis on their evolution and selective significance. Offered jointly with the Department of Psychology as Psychology 409. Prerequisite, 212 or Psychology 200, or equivalent.

#### ZOOL

#### 410 Ethology and Ecology Laboratory (1-4) Sp Orians, 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; Biology 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 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. Prerequisites, 20 credits in biological sciences and upper-division standing.

#### ZOOL

#### 432 Marine Invertebrate Zoology (8) SpS

Morphology and phylogeny of marine invertebrates. Offered at Friday Harbor Laboratories. Not open to students who have had 433, 434. Prerequisite, Biology 212.



## **ZOOI**

# 433, 434 Invertebrate Zoology (5,5) A,W

Illg, Kohn, Kozloff Morphology and phylogeny of invertebrates exclusive of terrestrial arthropods. Not open to students who have had 432. Prerequisites, Biology 212; 433 for 434.

#### 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 zoology and permission; 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

#### **Entomology Laboratory (2) Sp** 445 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

#### Concepts of Nervous System Function 449 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

Phylogeny of the chordates; structure, function, and evolution of vertebrate organ systems. Prerequisite, Biology 212.

#### ZOOL

#### 456 Developmental Biology of Animals (5) ASp

Bakken, Fernald, Schubiger Introduction to properties and experimental

analysis of developing systems, and a descriptive and comparative study of development with emphasis on chordates. The Autumn Quarter course emphasizes descriptive and comparative analysis. The Spring Quarter course emphasizes experimental aspects and the use of live material in the laboratory. Prerequisite, Biology 212. Prior completion of Zoology 301 recommended for the Spring Quarter course.

#### 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

#### Vertebrate Physiology (5) 458 Olsen, Martin

Emphasis on the physiology of nonmammalian vertebrates' major functions and organ systems viewed extensively from ecologic and evolutionary aspects. Special attention is given to respiration, circulation, excretion, locomotion, energy metabolism, seasonal adaptation. Prerequisite, 301.

#### 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

Lecture, laboratory, and field course. Students may be required to share a portion of the transportation costs of field trips. Prerequisites, Biology 212 and permission.

#### 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, Biology 212 and permission. (Offered alternate years.)

#### ZOOL

#### 468 **Comparative Physiology (5) Sp** Edwards, Martin, Olsen

Osmotic and ionic regulation, respiration, circulation, and excretion, with special emphasis on the variety of means with which animals solve common problems. Prerequisite, 301.

#### ZOOL

#### 469 Reproductive Endocrinology (3) Sp Gorbman

Regulation of the process of reproduction. Integration of reproduction with environmental features through behavioral and metabolic adjustments; its structural and functional evolutionary adaptive aspects. Endocrine modulation of the developmental process and its cellular mechanisms. Prerequisite, one year of college-level biology.

#### 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) W

Studies of the present distribution of terrestrial vertebrates and how it has come about, especially in relation to environment, evolution, and dispersal. Prerequisites, Biology 212 or equivalent, and one additional course involving some study of vertebrate classification, or permission.

#### 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

#### 498 **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

#### Comparative Developmental Physiology 517 (**6**) Whiteley

The topics of ogenesis, 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. Offered at Friday Harbor Laboratories. Prerequisite, permission.

#### ZOOL

#### 520, 521, 522 Seminar (1,1,1) A,W,Sp Farner

#### ZOOL

**Advanced Topics in Physiology** 528 (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 (6) 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. Of-fered at Friday Harbor Laboratories. Prerequisite, 10 credits in invertebrate zoology or equivalent.

# BUSINESS ADMINISTRATION

#### ZOOL

# 534 Topics in Advanced Invertebrate Zoology (3 or 6, max. 15) Illg, Kohn, Kozloff

Advanced considerations in morphology, ecology, phylogeny of invertebrates, emphasizing current developments. Six credits available at Friday Harbor Laboratories only. Prerequisite, permission.

#### ZOOL

#### 536 Comparative Invertebrate Embryology (6) SpS

Morphological and experimental studies of development of selected types of marine invertebrates. Offered at Friday Harbor Lab-oratories. Prerequisites, 433, 434, and 456.

#### ZOOL

538 Advanced Invertebrate Physiology (6) SpS Physiological bases of ecology, evolution, and tolerance to stress, as illustrated by many diverse forms. Offered at Friday Harbor Laboratories. Prerequisites, chemistry through or-ganic 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, Biology 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, Orians, Paine Graduate seminar on modern problems in ecology. Prerequisites, Biology 472 or equivalent, and permission.

#### 200L

#### **Ecology of Marine Communities (3)** 574 Paine

Lecture course emphasizing the ecological structure and functioning of marine communities. Topics include population interactions and dynamics, distributional patterns, bioenergetics, stability, and species diversity. Prerequisites, Biology 472 or equivalent, and permission.

#### ZOOL

#### 576 Environmental Marine Physiology (6)

The relationship of vertebrate and invertebrate physiology to physical factors in the marine environment. Instruction in principles and applications of modern instrumentation for quantitative study of animal-environment interactions. Offered at Friday Harbor Laboratories. Prerequisites, invertebrate and/or vertebrate zoology, one year of college physics, organic chemistry; physiology recommended.

#### ZOOL

#### 578 Advanced Ecology (5) Orians

Strategies of reproduction, habitat selection, foraging and spacing; theory of competition and predator-prey interactions; niche theory and community structure. Prerequisites, Biology 472 or equivalent, and permission.

#### ZOOL

581 Systematic Zoology (5) 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)

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.

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#### ZOOL

600 Independent Study or Research (\*) AWSnS

## 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 Fundamentals of Accounting (3) Basic concepts used in financial reporting, in-terpretation of financial statements. Prerequisite, 210. - 1

### ACCTG

# 230 Basic Accounting Analysis (3)

Analysis and evaluation of accounting information as part of the managerial processes of control, planning, and decision making. Concentrates on the use of information by those managing the enterprise and making decisions. Prerequisite, 220.

### ACCTG

#### 301 Intermediate Accounting I (3) 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. Pre-requisite, 302.

#### ACCTG

### 311 Cost Accounting (3)

Introduction to the theory of cost accounting; job order, process, and standard cost systems; overhead accounting; problems in accumula-tion and allocation of costs; decision making with cost data. Prerequisite, 301.

#### ACCTG

#### 371 Auditing or Industrial Internship (2)

One quarter's internship with a certified public accounting firm, industrial organization, or government agency. Prerequisite, prior departmental approval.

#### ACCTG

### 375 Topics in Financial Reporting (4)

Critical examination of the uses and limitations of general purpose financial statements that have been prepared in accordance with generally accepted accounting principles. Prerequisite, 230; not open to accounting majors.

#### ACCTG

411 Auditing Standards and Principles (3) Establishes a framework in which the student operates as a professional to examine the problems and the opportunities, the approaches and the methodology in performing the attest function and in expanding the attest function in the future. Prerequisites, 303, 311.

#### ACCTG

#### 421 Federal Income Tax (5)

Comprehensive development of individual and corporation income tax. Prerequisite, 303 or permission.

#### ACCTG

#### 430 Introduction to Information Systems (3) Study of the concepts of information systems in administrative organizations and the processes of analyzing and designing systems, with an emphasis on those using computer facilities. Includes sufficient study of computer systems to understand their present and future impact on information systems and to evaluate proposals for computerization of existing systems. Prerequisites, 230 and Quantitative Methods 200.

#### ACCTG

# 440 Accounting Systems (3)

Focuses on the integration of accounting and other information systems. The concepts and methodology of computerized information systems analysis and design, and a study of the management of the information function. As a part of systems design, the student is introduced to COBOL as a programming language used in business information systems. Advanced study of computer equipment and its impact on systems. Prerequisite, 430.

#### ACCTG

#### 450 Special Tax Problems (3)

Special problems in income tax, including partnerships, estates and trusts, corporate reorganization, gift and estate taxes, basic tax research. Prerequisite, 421.



#### ACCTG

460 Advanced Cost Accounting (3)

Advance analysis of cost and management accounting problems; special applications of cost accounting techniques for management planning and control; current developments in cost accounting. Prerequisite, 311.

### ACCTG

470 Case Studies in Auditing (4)

Application of standards and principles to case studies in auditing, including practice case. Prerequisite, 411.

### ACCTG

475 Administrative Controls (3)

The use of the budgetary, statistical, and accounting information in planning operations and achieving planned objectives through con-trol. Prerequisites, 230 and Quantitative Methods 201.

#### ACCTG

### 480 Fund Accounting (3)

Fund and budgetary accounting as applied to governments and to institutions, such as hospitals and colleges. Prerequisite, 302.

#### ACCTG

485 Consolidated Financial Statements (3) Accounting for parent-subsidiary and branch relationships; mergers; foreign exchange. Prerequisite, 303.

#### ACCTG

#### 490 Advanced Problems (3)

Intensive study of accounting principles, procedures, and presentations, principally through consideration of C.P.A. problems. Prerequi-sites, 311, 411, 421, 480.

#### ACCTG

495 Advanced Accounting Theory (3)

Theory of accounting related to income measurement, assets, and equities. Prerequisites, 303 and senior standing.

#### ACCTG

499 Undergraduate Research (3, max. 9) Arranged and supervised by individual members of the faculty. Prerequisite, permission.

#### ACCTG

#### 499B Special Study (3)

Advanced undergraduate study of special problem areas in accounting, such as various behavioral implications of accounting and financial reporting processes or accounting controls for social programs. Prerequisite, permission.

### **Courses for Graduates Only**

#### ACCTG

# 500 Managerial Accounting (3)

Covers concepts and procedures for determination and presentation of information for managerial and financial decisions. Income determination, cost analysis, and analytic reports. Interpretation, use, and limitations of accounting statements. Prerequisite, permission.

#### ACCTG

#### 501 Managerial Accounting (3)

Study of the generation and 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. Prerequisites, 500 and permission.

#### ACCTG

#### 510 Concepts in Accounting Measurements (3)

study of accounting principles Intensive 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, and the manager's responsibilities and opportunities in financial reporting. Prerequisites, 500 and permission.

#### ACCTG

511 Concepts in Accounting Measurements (3)

Identifying and measuring attributes of resources of the firm relevant to management decisions. Flows as they relate to time, volume of activity, units of product, segments of the firm, and functional responsibility. Problems of cost and revenue forecasting for planning and con-trol. Prerequisites, 500, 501, and 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. Prerequisite, permission.

#### 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. Prerequisites, 520 and 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; economic and accounting views of costs; current developments in cost accounting theory and practice. Prerequisite, permission.

#### ACCTG

540 Seminar on International Accounting (3) Emergence of the international accounting problem and organizations associated with the study of the issues involved; national differences in accounting thought and practice; international standards of accounting and auditing and financial reporting. Prerequisite, permission.

# ACCTG 570 Seminar on Auditing (3)

Examination of the changing business environment of the auditor and the impact of these changes on auditing philosophy, objectives, and methodology. The seminar focuses on the au-diting of integrated information systems, the use of computers as an audit tool, and the expansion of the reporting function. Management aspects of public accounting practice are examined. Prerequisite, permission.

# ACCTG

# 571-572 Research Reports (3-3)

Independent study in business administration; critical evaluation of business analysis and research methods. Effective communication of ideas is emphasized. Methods and content of independent research studies being completed by the students are subjected to critical evaluation. Open only to M.B.A. nonthesis students. Prerequisites, instructor's approval of preliminary research topic outline for 571-; 571- for -572

#### ACCTG

#### 585 Seminar on Management Control Systems (3)

Design of information systems for planning and control processes in large organizations; formulation of divisional goals and control criteria; motivation and measurement of divisional performance; administration of new investment programs; and general organization of the planning and control function. Prerequisites, 501, Administrative Theory and Organizational Behavior 550, and permission.

### ACCTG

#### 599 Doctoral Seminar on Accounting (3)

Study and research in advanced topics of accounting. The seminar is generally concerned with unpublished areas of research as well as research methodology and philosophy. It is conducted by visiting professors and depart-mental faculty. For doctoral students only. May be repeated for credit. Prerequisite, permission.

#### ACCTG

600 Independent Study or Research (\*)

### **ADMINISTRATION**

#### ADMIN

- 510 Integrative Administration (15 credits
- Summer Quarter; 5 credits Autumn, Winter, or Spring Quarter)
  - Johnson

Includes materials basic to the study and analysis of administration in organizations: 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 de-centralization, 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.

# **BUSINESS ADMINISTRATION**

# 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. Prerequisite, 90 credits.

# A ORG 461 Two-Person Behavior in Organizational Contexts (4)

Clinically examines those behavioral skills and processes that are most basic in the development of effective individual behavior in business and other organizational contexts. Emphasis on clinical practice in developing: (1) self-awareness; (2) skills and processes in face-to-face communication and interaction; and (3) structuring of effective interpersonal relationships in organizational contexts. Prerequisites, 460 or permission, and senior or graduate standing.

#### A ORG

#### 463 Administrative Behavior (4)

Studies practice and theory in formal organizations through selected readings and actual cases. Emphasizes the superior-subordinate relationship at all levels. Considers the adminis-trator's frame of reference, communication in organizations, motivation, informal organization, situational and environmental aspects, and administrative controls. Prerequisite, either Administrative Theory and Organizational Behavior 460 or Human Resource Systems 301.

#### A ORG

#### 464 **Racial, Ethnic, and Cultural Factors in** Administration (4)

Understanding racial, ethnic, and cultural factors and their impact on the administration of organizations. Emphasis on the comprehension of behavioral dynamics of discrimination through case analysis, role playing, and other exercises. Prerequisite, permission.

#### A ORG

499 Undergraduate Research (3, max. 9) Prerequisite, permission.

#### **Courses for Graduates Only**

#### A ÔRG

500 Human Relations in Organizations (3) Analytically examines basic clinical processes related to diagnosing organizational behavior and taking action, and such aspects as indi-vidual and group behavior, basic human relations skills, behavioral processes, and the effects of organizational systems and processes on human organization. Prerequisite, permission.

#### A ORG

#### 550 Organization and Management (3)

Studies concepts of power, authority and influ-ence, objectives and goals, decision making and planning, communication, delegation and de-centralization, 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

#### 565 Seminar on Comparative Administrative Theory (3)

Identifies and evaluates the variations that occur among significant factors within organizations, across organizations, institutional groups (business, education, health services, government), national cultures (U.S., Russia, France, Brazil) and supranational cultures (SEATO, EEC), and their effect upon unit effectiveness. Prerequisite, permission.

#### A ORG

#### 571-572 **Research Reports (3-3)** See Accounting 571-572 for description.

#### A ORG

575 Human Aspects of Administration (3) Examinés administration process with a primary focus on organizational behavior. Develops the basic contributions of social science and other sources in the formulation of administrative-organizational conceptual schemes. Critically evaluates administrative theory in relation to administrative practice. Prerequisite, permission.

#### A ORG

#### 576 Human Aspects of Administration (3)

Develops in depth some of the basic contributions to administrative theory and practice made by past and current research, thought, and experience. Typically examines several major research studies, drawing on findings from psychology, sociology, social and cultural anthropology, business administration, government, and other sources. Prerequisite, permission.

#### A ORG

577 Practicum in Human Relations (3) Utilizes the concepts, structures, methods, and techniques, commonly called the laboratory training method, for learning about personal and interpersonal phenomena. The course presents the opportunity for an in-depth examination of one's and 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. Prerequisite, permission.

#### A ORG

#### 580 Planning and Decision Theory (3)

Usually focuses on the development of a theory of decision making, with emphasis on behav-ioral aspects. Consideration of informa-tion-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

#### 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

#### Seminar on Advanced Organization 587 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, eco-nomic, and behavioral. Appraises the research methodologies in field studies, laboratory inves-tigations, 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 513

#### **Introduction to Information Processing** Systems (2)

Introduction to the use and the programming of computers for business applications. Programming problems in BASIC. Impact of computers on management. No credit if Quantitative Methods 200 has been taken. Prerequisite, permission.

BA

#### 515 **Introduction to Computer Information** Systems (4)

Provides further study of computer technology and its impact on administrative organizations. the design and implementation of computerized information systems, and some exposure to computer languages. The purpose of the course is to provide the knowledge required by an operating or staff manager to work effectively with specialists developing computerized information systems. Prerequisites, 513 and permission.

BA

700 Master's Thesis (\*) AWSp

BA

#### Doctoral Dissertation (\*) 800

# **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, hy-pothesis testing. Prerequisites, Quantitative Methods 201 or equivalent, doctoral standing, and permission.

#### **BA RM**

## 501 Statistical Methods II (4)

Continuation of 500. A treatment of statistical methods useful in doing research in the various areas of business administration. Includes multiple regression, analysis of covariance, nonparametric statistics. Prerequisites, 500 and permission.

#### BA RM

#### 510 Applied Econometrics I (3)

Emphasizes the application of econometric methods rather than the mathematical proofs of statistical procedures. Introduction to the linear regression model, interpretation of summary statistics, bias and precision of regression estimates, analysis of the residuals. Prerequisites, 500 and 501, and permission.

#### **BA RM**

511 Applied Econometrics II (3) Continuation of 510. Hypothesis testing, distributed 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 be-havioral research. Prerequisites, 500 and 501, and 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**

**BCMU** 

#### 301 Basic Written Business Communications (4)

Broad analytical approach to written communications as a management tool. Analysis of the psychology, semantics, planning, and principles of effective business writing. Practical application through messages that inform and persuade, grant and refuse; plus short business reports and applications for positions. Prerequisite, junior standing or above.

#### **B**CMU

#### 410 Business Reports and Other Specialized **Communications (5)**

Covers both internal and external communications that businessmen and businesswomen write on the job. Emphasis is on various types of internal reports, ranging from short informal memos to the more complex formal reports. Also covered are specialized external types of communications directed to customers. Prerequisite, junior standing or above.

## **BUSINESS ECONOMICS**

#### B ECN

300 Managerial Economics (3) Analysis of economic factors affecting decisions made by business firms. Demand and cost analysis, and alternative policies from the firm's point of view. Prerequisite, Economics 201.

#### **BECN**

# 301 Money, National Income, and Prices (4) Measurement and analysis of business activity in the commodity and money markets; static and dynamic models of income and interest rate determination; problems and policies in the stabilization of business conditions. Prerequisites, Economics 200 and 201.

#### **BECN**

# 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 Quantitative Methods 201.

#### **BECN**

**499** Undergraduate Research (3, max. 6) Research in selected areas of business economics. Prerequisites, 300 and 301, and permission.

#### **Courses for Graduates Only**

#### **BECN**

500 Business Economics I (3) Factors underlying the determination of cost and prices for the industry and the firm; demand analysis. Prerequisite, permission.

#### **BECN**

501 Business Economics II (3)

Analysis of real and monetary factors affecting the national and international economic environment, supply and demand for money, interest rates, stabilization problems and policies. Prerequisites, 500 and permission.

#### **B ECN**

#### 512 Advanced Managerial Economics (3)

Focus is on application of basic firm theory as developed in 500. Principles of optimum resource allocation, empirical estimation of cost and demand schedules. Prerequisites, 500 and Quantitative Methods 500, and permission.

#### **BECN**

#### 513 Macroanalysis for Business (3)

National income and output analysis; examination of dynamic income-expenditure models; economic growth and industry change. Prereq-uisites, 501 and permission.

#### **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, and Finance 420, and permission.

#### **BECN**

# 524 Seminar on Forecasting (3)

Problems of forecasting business conditions; analysis of forecasting methods and techniques of preparing forecasts used by corporations, advisory services, and government. Empirical as well as theoretical problems. Prerequisites, 513.

#### **BECN**

526 Industry Structure and Performance (3) Market structure, conduct, and performance; mergers and diversification; price and nonprice patterns of firm behavior. Prerequisite, permission.

#### **BECN**

#### 571-572 Research Reports (3-3)

See Accounting 571-572 for description.

#### **BECN**

#### 588 Seminar on Applied Microeconomic Analysis (3)

Seminar on applied microeconomic analysis: emphasis on individual selected topics and presentation of papers with application to economic problems of industries and firms, such as the estimation of aggregate production functions for industries, consumer preference patterns, firm forecasting and intrafirm pricing policies. Prerequisite, permission.

#### **BECN**

#### **Doctoral Seminar on Business** 599 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.

#### **BECN**

600 Independent Study or Research (\*)

# **BUSINESS, GOVERNMENT,** AND SOCIETY

### **Courses for Undergraduates**

#### RC&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 re-lated 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.

### BG&S

#### 310 Legal Aspects of Business and Public Policy (5)

Legal questions involved in government and economic institutions, including government regulation of competition; business-labor relations, government ownership; government assistance to business as well as business influences on government; regulation and the alternative of public control in selected case studies

# BUSINESS ADMINISTRATION

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.

#### RC&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, nego-tiable 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.

#### RG&S

445 Comparative Enterprise Systems (5) Investigation of functions, modes of operation, and methods of coordinating business enterprises in various economic systems, ranging from the competitive to the highly centralized.

#### BG&S

#### 490 Special Topics and Issues in Business,

Government, and Society (3, max. 9) Emphasis is on contemporary topics and issues of business in their governmental and societal contexts. The content of the course reflects contemporary developments and the current interests of the instructors and students. Prerequisite, permission.

#### BG&S

499 Undergraduate Research (3, max. 9) Selected problems in social, legal, and eco-nomic institutions. Prerequisite, permission.

#### **Courses for Graduates Only**

#### BG&S

#### 510 Business and Public Policy (3)

Legal institutions and processes in the de-velopment 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 Accounting 571-572 for description.

### BG&S

#### 575 Theories of Capitalism (3) Focuses upon the various theories of capitalism developed over the past several centuries and their relevance for our contemporary society. Prerequisite, permission.

#### BG&S

590 Business History (3)

Development of the American business system, with special emphasis on dynamic forces, both internal and external, that shape the form and character of 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

#### **Doctoral Seminar on Business,** 599 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 depart-mental faculty. May be repeated for credit. Prerequisite, permission.

#### RC&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 con-trol, and continuous reappraisal of policies and objectives. This course integrates and builds upon the work of the core curriculum. Prerequisites, senior standing or above and Finance 350, Marketing 301, Operations and Systems Analysis 301, and Human Resource Systems 301 or Administrative Theory and Organizational Behavior 460, or permission.

#### **B POL**

#### 471 Problems of the Independent Businessman (4)

The role of small business in the economy. Case studies of problems faced by owner-managers of small business enterprises. The managerial role in establishing and operating new businesses. Case studies of problems involved in translating new product or service ideas into economic enterprises. Emphasis on the decision-making process in choosing a strategy and implementing it. Prerequisites, senior standing or above and Finance 350, Marketing 301, Operations and Systems Analysis 301 and Human Resource Systems 301 or Administrative Theory and Organizational Behavior 460, or permission.

#### B POL

#### 480 Business Simulation (5)

Critical analysis of integrated business policy formulation in a complex and dynamic industrial environment by means of simulation (business gaming). Prerequisites, senior standing or above and Finance 350, Marketing 301, Operations and Systems Analysis 301 and Human Resource Systems 301 or Administrative Theory and Organizational Behavior 460, or permission.

#### **B POL**

499 Undergraduate Research (3, max. 9) Prerequisite, permission.

#### **Courses for Graduates Only**

#### B POL

#### 571-572 Research Reports (3-3) See Accounting 571-572 for description.

#### **B POL**

593 Policy Determination and Administration (3)

Analysis of policy problems faced by chief administrative officers of business firms. Determining of objectives; development of policies to achieve objectives; organization of

executive personnel to implement policies; coordination of the organization; appraisal and adjustments to changes in the environment. The course is intended to give a clearer insight not only into how business decisions are reached but also into the motivation of businessmen in deciding upon courses of action in varying circumstances. It is recommended that this course be scheduled toward the end of the student's course work. Prerequisites, second-year standing in M.B.A. program and permission.

#### **B POL**

#### 594 Policy Determination and Administration (3)

Advanced analysis of policy problems faced by chief administrators of organizations. Course includes case studies and business gaming. It is recommended that this course be scheduled toward the end of the student's course work. Prerequisite, 593.

#### **B POL**

#### 595 Entrepreneurship (3)

Course focuses on entrepreneurship, both in the form of (1) establishment of new independent businesses owned largely by those who manage them and (2) initiation of new enterprises having exceptional autonomy within larger organizations that finance and own them. Basic knowledge in accounting, marketing, and finance is assumed. Prerequisite, permission.

#### **B POL**

#### 596 **Technological and Social Responsibilities** in Management Decisions (3)

The job of any manager, whether in a corporation, hospital, or government agency, in-cludes: awareness of the technical responsibility of the organization to provide efficient goods or services to society; awareness of human responsibility of the organization to provide a good life for human beings inside and outside the organization; and an ability to reconcile and balance these often conflicting values in managerial (policy) type decisions. The primary goal of the course is to develop a method for making this kind of decisions by use of case analyses and selected reading. Prerequisite, second-year standing.

# **FINANCE**

### **Courses for Undergraduates**

#### FIN

#### 350 Business Finance (4)

Sources, uses, cost, and control of funds in business enterprises. Internal management of working capital and income sources and cost of long-term funds; capital budgeting; financing of the growth and expansion of business enter-prises; government regulation of the financial process. Prerequisite, Business Economics 300.

#### FIN

#### 420 Financial Markets (4)

Analysis of the structure and functions of the money and capital markets; the saving-investment process and financial intermediaries; supply and demand for lendable funds and the level and structure of interest rates, role of Federal Reserve and Treasury in money market developments. Prerequisite, Business Economics 301.

#### FIN

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, **Business Economics 301.** 

#### FIN

### 450 Problems in Corporation Finance (4)

Case problems in corporate financial management. Includes cases on management of current assets, obtaining short-term loans, raising long-term capital, capital budgeting, and dividend policy. The management point of view is stressed. Prerequisites, 350 and Accounting 375.

#### FIN

453 Financial Theory and Analysis (4) Determination of liquidity needs subject to firm constraints and longer term capital budgeting problems involving cost of capital and capital rationing considerations; analytical approach. Prerequisites, 350 and Quantitative Methods 201.

### FIN

# 460 Investments (4)

Introduction to the nature, problems, and process of evaluating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate of return aspects of particular securities, securities portfolios, and total wealth. Prerequisite, 350.

#### FIN

### 461 Investment Analysis (4)

A sequence course to 460 in which traditional investment analysis of securities is explored in more detail, and special emphasis is directed to more recent developments, especially portfolio analysis. Prerequisite, 460.

#### FIN

#### 499 Undergraduate Research (3, max. 6)

Research in selected areas of business finance, money and banking, or investments. Prerequi-sites, 350 and permission.

#### **Courses for Graduates Only**

# FIN 502 Business Finance (3)

Financial management of the firm including capital budgets, working capital analysis, and dividend policy. Prerequisite, permission.

#### FIN

#### **Capital Investment in Urban** 515 **Development (3)**

Develops principles for evaluating opportunities to invest in urban real estate, discusses the question of determining the cost of capital for such investments, investigates some problems in the application of an appropriate investment criterion to specific types of opportunities, and explores some aspects of the urban renewal problem. Offered jointly with Urban Development as Urban Development 515. Prerequisite, permission.

#### FIN

#### Money Markets (3) 520

Analysis of the functions and the structure of

money markets; the saving-investment process and financial intermediaries; supply and demand for lendable funds and the level and structure of interest rates, role of the Federal Reserve and Treasury in the money markets. Prerequisites, Business Economics 501 and permission.

#### FIN

# 521 Seminar on Financial Markets (3)

Analysis of managerial and environmental financial problems of banks and nonbank financial institutions; theory of flow of funds and financial intermediation. Prerequisites, 420, and Business Economics 500, 501, and permission

#### FIN

#### 527 Seminar on International Finance and Investments (3)

Study of selected problems in financing, international trade, investment, and foreign business operations; international aspects of money markets; problems of evaluation of foreign investments. Prerequisites, 502 and permission.

#### FIN

# 550 Advanced Business Finance (3)

Systematic coverage of the theory of financial management. Application of quantitative analysis to the financial problems of the firm. Examination of empirical studies on the financing of the modern corporation. Prerequisites, 502 and permission.

#### FIN

#### 551 Problems in Business Finance (3)

The application of financial principles and techniques to problems in financial management. Topics include cash management, credit management, problems in short-term and long-term financing, and capital budgeting. Prerequisites, 502 and permission.

#### FIN

### 552 Seminar on Business Finance (3)

Study of the financing of the corporation, including recent theoretical and institutional developments. Extensive reading and discussion in designated areas covering problems relating to financial management and to the social and economic implications of the financial process. Prerequisites, doctoral standing and permission.

#### FIN

#### 560 Investments (3)

Introduction to the nature, the problems, and the process of evaluating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate-of-return aspects of particular securities, securities portfolios, and total wealth. Prerequisites, 502 and permission.

## FIN

#### 561 Seminar on Investments (3)

Discussion and analysis of concepts, processes, and problems of investment media valuation, portfolio valuation, and portfolio construction, and administration for individuals and institutions. Prerequisites, 460, 502, and permission.

# FIN

# **571-572** Research Reports (3-3) See Accounting 571-572 for description.

#### FIN

599 Doctoral Seminar in Finance (3) Study and research in advanced topics of finance. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty.

# BUSINESS ADMINISTRATION

May be repeated for credit. For doctoral students only. Prerequisite, permission.

#### FIN

600 Independent Study or Research (\*)

# HUMAN RESOURCE SYSTEMS

#### **Courses for Undergraduates**

#### HRSYS

#### **301** Personnel Systems and Industrial Relations (3)

The recruitment, selection, utilization, and development of human resources, with special emphasis on union-management relations and relevant behavioral science research.

#### HRSYS

#### 443 Staffing (4)

Includes manpower planning, recruitment, testing, selection, placement orientation, training, 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 Sciences (3)** Depth analysis of the utility, reliability, and validity of current and proposed personnel devices and systems in staffing, directing, ap-

praisal, compensation, training and develop-ment, and collective bargaining. Prerequisite, permission.

#### HRSYS

#### 541 Management-Employee Relations Systems in the White Collar and **Professional Sectors (3)**

Focuses on current and emerging forms of

management and employee relations systems. Primary emphasis is given to new forms of white-collar unionization, bargaining and quasi-bargaining situations between professionals and management, and emerging forms of third-party participation in these relationships. Prerequisite, permission,

#### HRSYS

571-572 Research Reports (3-3) See Accounting 571-572 for description.

#### HRSYS

**Doctoral Seminar in Personnel and** 599 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.

#### HPSVS

600 Independent Study or Research (\*)

# **INTERNATIONAL BUSINESS**

### **Courses for Undergraduates**

#### I BUS

310 Principles of International Business (5) Broad study of the major forms of international business: export and import trade, overseas investment, production and marketing operations; licensing, financing, and other services. Theoretical principles, government policies, business practices. Prerequisite, junior standing or permission.

#### I BUS

#### 330 Business Environment in Developing Nations (4)

international environment for transna-The tional 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 multi-lateral 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

Case studies in foreign operations management: planning international objectives and strategies; developing multinational company structures and executives; adapting administrative prac-tices 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 Accounting 571-572 for description.

#### I BUS

#### 595 Business Studies Abroad (\*, max. 9)

Research and study of foreign business problems in the country or countries where the 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

#### **Doctoral Seminar in International** 599 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 func-tions, institutions, channels, prices, and public policy. Not open to business administration students for credit, nor to those who have taken 301.

#### MKTG

301 Marketing Concepts (4) Analysis of tools, factors, and concepts used by management in planning, establishing policies, and solving marketing problems. Topics cover marketing concepts, consumer demand and behavior, location analysis, marketing, functions, institutions, channels, prices, and public policy. Prerequisite, Economics 201.

#### MKTG

#### 341 Product and Price Policies (4)

Examines important aspects of product plan-ning and development, product line decisions, packaging, brand policies, guarantees, and services. Price theory is considered but emphasis is placed on special pricing policies and problems and legal constraints on pricing activity. Prerequisites, 301 and Business Economics 300.

#### MKTG

#### 350 Marketing Management (4)

Analysis of marketing management areas. Major areas covered are: market evaluation, product planning, promotion, channels and dealer relations, pricing and government con-trols, physical distribution, organization and planning and control of marketing activities. Prerequisite, 301.

#### MKTG

361 Marketing Channels and Institutions (4) Analysis of marketing institutions and their functions, marketing channel structure, and channel alternatives available to management. Special attention is given to the role and perspective of the channel manager in directing marketing channel systems. Not open to stu-dents who have taken 381. Prerequisite, 301 or equivalent.

#### MKTG

# 381 Retailing (4)

Profit planning and business control; buying, stock control, pricing, promotion; store location, layout, organization, policies, systems; coordination of store activities. Not open to students who have taken 361. Prerequisite, 301.

#### MKTG

# 401 Sales Management (4)

Sales and distribution planning; sales organization and training; management of the sales force; methods of sales, cost, and performance analysis. Prerequisite, 301.

# MKTG

# 411 Advertising (4)

The management of the advertising function and its integration with other forms of promotion. Topics covered are planning the program; determining the most effective approach; evaluation of media and budget; advertising research; advertising institutions; economic and social aspects. Prerequisite, 301.

#### MKTG

# 415 Consumer Behavior (4)

Theory and practice pertinent to marketing decisions of individuals and business firms; utilization of theories from behavioral sciences in marketing research; theories of fashion, characteristics of goods, shopping behavior, product differentiation, market segmentation, and opinion leadership; application of concepts to management of advertising, personal selling, pricing, and channels of distribution. Prerequisite, 301; Quantitative Methods 201 recommended.

#### MKTG

421 Marketing Research (4) The marketing research process; preliminary steps and research design, questionnaires, sec-ondary and primary data, sampling, processing and interpreting data, evaluation and effective presentation of findings. A class research proj-ect provides practical application of methods studied. Prerequisite, 301.

#### MKTG

#### 430 Quantitative Methods in Marketing (4)

Application of quantitative methods to marketing decision problems, such as product testing, advertising effectiveness, routing of salesmen, distribution systems, pricing, and marketing models. Methods include analysis of variance, multiple regression, Bayesian statistics, linear programming, and others as appropriate. Prerequisites, 301 and Quantitative Methods 201 or equivalent.

#### MKTG

481 Retail Field Work (2, max. 8) Open to scholarship students only. Prerequisite,

# permission.

## MKTG

491 Marketing Problems (4)

Analysis of managerial marketing problems of the manufacturer, wholesaler, and retailer. Prerequisites, 301 and senior standing.

#### MKTG

499 Undergraduate Research (3, max. 9) Prerequisite, permission.

### **Courses for Graduates Only**

#### MKTG

500 Marketing Management (3)

Analysis of markets and institutions, and the role of marketing in the economy. Considerations necessary for sound marketing manage-ment 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)

**BUSINESS ADMINISTRATION** 

Principles, structure, and channel implications of both wholesale and retail distribution; factors affecting channels; selected product channels; physical distribution factors; marketing cost analysis and control. Prerequisites, 500 and permission.

#### MKTG

# 515 Price Practices and Policies (3)

The nature of pricing decisions; price theory and practice; primary and secondary factors affecting price policy; pricing methods and strategies; pricing practices in selected indus-tries. Prerequisites, 500 and permission.

#### MKTG

520 Seminar on Promotion in Marketing (3) Examination of topics of importance in the promotion of the firm's goods and services in its markets. Prerequisites, 500 and permission.

#### MKTG

#### 521 Seminar on Measurement in Marketing (3)

The theory and application of experimental designs in marketing. Emphasis is placed on the underlying logic of experimentation and the analysis and interpretation of experimental data dealing with a variety of marketing problems. Prerequisites, 500 and Quantitative Methods 500, and permission.

#### MKTG

522 Advanced Marketing Concepts (3) The interdisciplinary exchange of ideas related to marketing is studied. The marketing theories and evolving concepts of marketing and management are critically appraised. Prerequisites, 520 or 521, and permission.

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.

571-572 Research Reports (3-3) See Accounting 571-572 for description.

#### MKTG

#### 599 Doctoral Seminar in Marketing (3)

Study and research in advanced topics of marketing. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. May be repeated for credit. For doctoral students only. Prerequisite, permission.

#### MKTG

600 Independent Study or Research (\*)

# **OPERATIONS AND** SYSTEMS ANALYSIS

### **Courses for Undergraduates**

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

# BUSINESS ADMINISTRATION

transactions in systems, maintenance of efficiency, statistical analysis of systems behavior, use of computers and quantitative models in analysis and control of operations. Prerequisites, Quantitative Methods 200, 201, or permission.

#### **OPSYS**

#### 401 Administration of Operations (4)

Case problems of decision situations confronting managers of operations. Cases focus upon a systems approach to decisions, system analysis, and application of analytical techniques in actual situations. Problems of implementation in design and planning of operating systems, and in control of systems. Includes problems of resource allocation, project planproteins of resource anocation, project plan-ning, scheduling, inventory, quality control, cost control, distribution systems, facilities planning, and coordinating operations with other parts of the enterprise. Prerequisite, 301 or permission.

### OPSYS

#### 441 Systems Theory and Design (4)

Planning and design of systems, including analytical techniques particularly suited to systems design (e.g., systems dynamics, continuous-flow computer simulation models, systems analysis, and network analysis). Analysis of organizations as complex systems, empha-sizing the interactions between management decisions and information feedback. Prerequisite, 301 or permission.

#### **OPSYS**

#### 442 Operations Planning and Control (4)

Analysis of design, planning, and control of operating systems. Topics vary among facilities location, layout, capital equipment selection and replacement, design of statistical control systems, and applications of improvement curve theory to systems planning and control. Pre-requisite, 301 or permission.

#### **OPSYS**

443 Scheduling and Inventory Systems (4) Analysis of alternative scheduling and inventory systems with emphasis on application of mathematical models and computer simula-tion. Includes effective utilization of inventory resources, inventory systems, distribution systems, aggregate forecasting and scheduling, network planning methods, job shop scheduling, and sequencing operations. Prerequisite, 301 or permission.

#### **OPSYS**

499 Undergraduate Research (3, max. 9) Prerequisite, permission.

#### **Courses for Graduates Only**

#### **OPSYS**

500 Operations and Systems Analysis (3). Study of the management of operations in business and public enterprises. Basic concepts, philosophy, and techniques of analysis for management decision making; analysis of structure and dynamic behavior of management systems; use of computers and quantitative models in planning and control of operations; selection of resources; choosing among alternative systems of operations. Prerequisites, Quantitative Methods 500 and permission.

#### **OPSYS**

520 Systems Analysis and Current Issues (3) Evaluation and redesign of organizations using the systems approach. Both macrosystems and microsystems are studied; however, the emphasis is on the larger units, for example, corporate conglomerates or metropolitan centers. Each member of the class selects some segment of an issue to research, but all use the same model for analysis. Prerequisites, 500 and permission.

#### **OPSYS**

#### 521 Studies in Operations Analysis (3)

Policy formulation and administration of operating sectors of organizations, emphasizing applications of quantitative models to operating problems, systems analysis, and integration of functions of operations management with the major goals of the organization. Case studies and models are used. Prerequisites, 500 and permission.

#### **OPSYS**

#### 571-572 Research Reports (3-3)

See Accounting 571-572 for description.

#### **OPSYS**

# 577 System Dynamics (3)

Analysis of the feedback structure and dynamic behavior of management decision and information systems. The dynamics of management decision making from an overall systems point of view. Emphasis on the inter-action 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.

#### **OPSYS**

582 Analytical Models (3, max. 6) Application of quantitative methods to operations problems. Content varies. Topics include inventory, theory, location, scheduling, maintenance scheduling, quality control, with one or two areas covered in depth each quarter. Prerequisites, 500 and Quantitative Methods 510, and permission.

#### **OPSYS**

585 Systems Analysis Models (3, max. 6) Study of elements and structure of system analysis models. Examination of systems analysis in public sector, of complex organizations, and in environmental affairs. Emphasis on quantitative, computer-oriented forms of analysis. Prerequisite, permission.

#### **OPSYS**

#### Doctoral Seminar in Operations and 599 Systems Analysis (3)

Study and research in advanced topics of operations management. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. May be repeated for credit. Prerequisite, permission.

#### **OPSYS**

600 Independent Study or Research (\*)

#### **QUANTITATIVE METHODS**

### **Courses for Undergraduates**

### QMETH

200 Computer Programming (2) Introduction to computer programming using the BASIC language and "canned" programs. Applications to business problems. (Not recom-mended for students with credit for Engineering 141 or Mathematics 114.)

## 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 Mathematics 157.

#### QMETH

### 350 Quantitative Analysis for Business (4)

Introduction to mathematical tools utilized for analysis of business problems; appreciation of the use of these tools in business situations; calculus; linear algebra. Prerequisites, 200 and Mathematics 157.

#### QMETH

#### 401 Statistical Methods for Business Research (4)

Sampling distributions, estimation, tests of hypotheses, simple nonparametric methods, elements of statistical decision theory. Prerequisite, 201.

#### QMETH

404 Computer Programming for Business (4) Programming techniques and languages for solution of quantitative business problems. Assembly language, FORTRAN, COBOL. Basic data-processing techniques. Programming as-signments. 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

#### Probability and Statistical Inference 430 for Business (4)

Introduction to calculation concepts of probability, random variables, moments, and probability models. Includes applications of probability in management decision making. Prerequisite, 350 or equivalent.

#### QMETH

#### **Operations Research—Deterministic** 450 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. Prerequi-site, 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**

#### 500 Business Statistics (3)

Treatment of statistical methods useful in the decision-making process. Includes descriptive statistics, probability and inference, correlation,



and regression. Emphasis on basic concepts and application. Prerequisites, Mathematics 157 or equivalent, and permission.

#### QMETH

### 510 Quantitative Methods (3)

Survey of operations research techniques for business problem solving. Emphasis on linear programming and general mathematical programming techniques. Prerequisites, 500 and permission.

### QMETH

#### 516 Statistical Decision Processes for Business (4)

Application of utility theory, probability theory, and game theory to decision making under conditions of risk and uncertainty. Bayesian approach to decision making. Prerequisites, 500 or equivalent, and permission.

#### QMETH

# 521 Applied Multivariate Analysis (4)

Exploration and inference for the association of two variables. Formulation of prediction equation using simple and multiple regression. Selection of variables in regression equation, use of dummy variables and analysis of covariance. Matrix approach to linear statistical models. Prerequisite, 500.

#### QMETH

#### 529 Topics in Applied Business Statistics (4, max. 8)

Seminar in the application of statistical techniques; topics are selected from nonparametric statistics, advanced application of statistical techniques in administrative control, advanced multivariate analysis, theories and techniques of time series analysis, and index.

#### QMETH

#### 530 Stochastic Series Analysis and Forecasting (4)

Introduction to modern time series analysis and forecasting. Autoregressive, moving average, and mixed models. Practical methods for model identification, estimation, diagnostic checking, and adaptive forecasting. Oriented toward real data and application. Prerequisite, 500; 521 or equivalent strongly recommended.

### QMETH

#### 550 Seminar in Operations Research Techniques (3, max. 6)

Intensive study into operations research techniques relevant to business analysis. Selected topics include: extensions of linear programming, solution of large systems, stochastic processes, dynamic programming, discrete programming, and network models. Prerequisites, 450 and permission.

#### OMETH

## 551 Mathematical Programming (4)

Advanced topics in linear programming and an introduction to nonlinear programming; the managerial significance of nonlinear simplex algorithms, decomposition of large linear programs, shortest route problems, unconstrained optimization of nonlinear functions, steepest descent and feasible direction methods, quadratic and separable programming; Kuhn-Tucker conditions for nonlinear programming, penalty functions. Prerequisite, 510 or 450 or Mathematics 407.

### QMETH

#### 552 Stochastic Models in Operations Research (4)

Optimal decision making in an uncertain en-

vironment; probabilistic dynamic programming, including finite horizon and unbounded horizon models, Markov chain models, inventory models, and waiting line models. Not open for credit to students who have taken 451. Prerequisite, 510 or 450 or Mathematics 407.

#### QMETH

#### 560 Research Seminar in Operations Research (4, max. 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.

#### QMETH

571-572 Research Reports (3-3) See Accounting 571-572 for description.

#### OMETH

#### 589 Seminar in Business Computer Systems (4)

Investigation into the applications of digital computers in the business environment. Possible topics include economic feasibility of using computers in business, computational algorithms for business data analysis problems, computational approaches to problems of operations research, and application of artificial intelligence techniques to business problems. Prerequisites, 404, 500, and 510 (or equivalent) and permission.

#### QMETH

#### 599 Doctoral Seminar in Quantitative Methods (3)

Study and research in advanced topics of quantitative methods. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. May be repeated for credit. For doctoral students only. Prerequisite, permission.

#### **QMETH**

600 Independent Study or Research (\*) Prerequisite, permission.

# **RISK AND INSURANCE**

#### **Courses for Undergraduates**

#### **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.

# RINS

#### 480 Risk Control (4)

Control of nonmarket risks as a managerial function. Evaluation of alternative courses of action. Influence of competitive pressures and regulation of the insurance industry. Prerequisite, 310.

#### 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

# DENTISTRY

distribution systems. The socioeconomic impact of advancing technology in transportation. Prerequisite, permission.

#### TRANS

520, 521 Trends and Contemporary Problems in Transportation Management, National Policy, and Regulation (3,3)

Impact of changing patterns and programs in transportation on the economy and individual firms. Primary and secondary source data and the interpretation of this information in researching transportation problems and arriving at solutions. Each quarter different aspects are emphasized. Prerequisites, 505 and permission.

#### TRANS

571-572 Research Reports (3-3) See Accounting 571-572 for description.

#### TRANS

600 Independent Study or Research (\*) Prerequisite, permission.

**URBAN DEVELOPMENT** 

#### **Courses for Undergraduates**

#### UD

310 Urban Development Economics (4) Introduction to real estate markets, investment, appraisal, accessibility concepts, urban his-tory, urban research, and related topics.

#### UD

320 Law of Urban Development (3) Legal aspects of modern land utilization including the urban plan, zoning, and private and public ownership—with preliminary discussion of the nature of property and a brief survey of

#### UD

real property law.

#### 395 Urban Development and Private Investment (4)

Emphasizes the role of the private sector in urban development; valuation and investment theory; techniques of investment analysis and capital allocation.

#### UD

#### 405 Urban Development and Location of Firms (4)

Practical workshop on empirical methods to conduct and evaluate locational studies.

#### UD

#### 496 Research in Urban Development (3)

Workshop in problems of multivariate prediction. Application and critical evaluation of multiple regression, factor analysis, and case analysis techniques.

#### **Courses for Graduates Only**

## 510 Urban Development (3)

Topical survey of urban development. Objective to provide substantive information, methodology, and theory, and base for additional courses and seminars in area. Topics include urban economy and determinants of land use, capital investment in urban development, land tenure, urban functions and public sector, urban development policy and strategy. Prerequisite, permission.

#### UD 515

#### **Capital Investment in Urban** Development (3)

Develops principles for evaluating opportunities to invest in urban real estate, determinants of cost of capital. Investigates prob-lems in application of appropriate investment criteria and aspects of urban renewal problems. Offered jointly with the Department of Finance, Business Economics, and Quantitative Methods as Finance 515. Prerequisite, permission.

#### UD

525 Urban Development and the Location of Firms (3)

Advanced workshop on empirical methods to conduct and evaluate locational studies. Prerequisites, 510, 515, or permission.

# 571-572 Research Reports (3-3)

See Accounting 571-572 for description.

#### IID

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.

# SCHOOL OF DENTISTRY

# **COMMUNITY DENTISTRY**

#### COM D

400 Introduction to Community Dentistry (1) Sp

#### Guild

Introduction to the social, political, and economic aspects of the health care delivery system.

#### COM D

#### Community Dentistry (2) W 410

Middaugh Social, economic, political, and psychological aspects of dental practice.

#### COM D

#### 420 Community Health (2) Sp

Guild Social aspects of dental health care delivery systems in the United States and elsewhere.

#### COM D

Dental Psychiatry (1) Sp 421

Heilbrunn

#### Psychological aspects of dental practice.

## COM D

430 Jurisprudence (1) A Wilson

Legal problems and obligations incident to the practice of dentistry: state dental laws, con-tracts, malpractice, and dentists as expert witnesses.

## COM D

#### 431 Pre-paid Dental Care (2) W Guild

Recent social, economic, and political developments relevant to the dental profession.

#### COM D

# 449 Directed Studies in Community Dentistry

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

345 Oral Prophylaxis (2) W Hoople

Clinical course for freshman dental students, including objectives, techniques, and procedures for performing oral prophylaxis, with application of these procedures to patient treatment and preventive control programs.

**DHYG** 

# 347, 348, 349 Dental Hygiene Procedures (4,6,6) A,W,Sp Laine, Langslet, Wells

Clinical dental hygiene courses coordinating dental and oral anatomy, dental materials, occlusion, radiography, and other related dental subjects. Clinical experience under close supervision.

#### D HYG

350 Clinical Oral Prophylaxis (6) S Continuation of 349. Prerequisites, 349 and permission.

#### D HYG

#### 401 Office Procedure and Ethics (2) Sp

Koch Dental office and clinic procedure; dental and dental hygiene ethics, professional interrela-

tionships.

#### **D** HYG

#### 402 Community Dental Health (3) W Wells

Field experience in community health, with emphasis on dental hygiene care in specific community health programs. Seminars in-clude 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) W

Farrell

Presentation and analysis of current principles of dental health and disease, with emphasis in the areas of plaque control, nutrition, teaching materials, and techniques.

#### **DHYG**

445 **Advanced Clinical Techniques** 

(2 or 4, max. 8) AWSpS Advanced instrumentation and clinical procedures for certificated dental hygienists. Seminars and clinical experience. Prerequisites, certificate in dental hygiene from an accredited program and permission.

#### D HYG

#### 446 Field Practice (2) AWSp Farrell

Application of dental health principles and practices to field experience in the health departments, the educational system, in hospitals, and/or special clinic assignments. Includes experience in the dynamics of the interrelationships between health professionals and other agency personnel.

#### D HYG

# 447 Dental Hygiene Practice (4) A

Anderson, Hoople, Murphy Fourth in a sequence of six clinical dental hygiene courses designed to provide the student with information and techniques used in performing all phases of dental hygiene services. Students are expected to recall, apply, and utilize information and technical procedures in all previous courses in performing dental hygiene services.

#### D HYG

#### 448 Dental Hygiene Practice (4) W Anderson, Murphy

Fifth in a sequence of six clinical dental hygiene courses with greater emphasis in performing operative procedures. Emphasis is placed on recalling and using information and technical services to provide total patient care.

#### **DHYG**

# 449 Dental Hygiene Practice (4) Sp

Anderson, Hoople, Murphy Final undergraduate clinical dental hygiene course, including supervised opportunity for experience, knowledge, and skill in all areas of student interest and dental hygiene specialties.

#### DHYG

450 Dental Hygiene Practice (6) S Continuation of 449. Prerequisite, 449.

#### D HYG

#### 491 Seminar in Dental Hygiene (2) AWSp Fales

Study of professional education, accreditation, legislation, organization, and literature. Responsibilities of the dental hygienist to the community.

#### **DHYG**

#### 492 Readings in Current Literature in Dental Hygiene and Preventive Dentistry (2) AWSpS

Fales

Discussion of reported readings and survey of background material, with emphasis on dental research and its application to dental health education.

#### DHYG

493 Problems in Dental Hygiene (2-4) AWSpS Problems for study directed toward increased understanding in the selected field of practice. Presentation of research suitable for publicacation. Prerequisite, permission.

#### **DHYG**

#### 494 Principles of Teaching in Dental Hygiene (2) AWSpS Fales

Application of principles of learning to

teaching methods and techniques effective in dental hygiene, with opportunity for course planning, demonstration, and practice teaching.

#### **DHYG**

#### 497 Directed Studies in Dental Hygiene (\*) AWSp8

Elective course based on student interest in special areas of preventive dentistry or dental hygiene education. The course allows inde-pendent study and a tutorial student-faculty relationship. May be repeated for credit. Prerequisites, permission of class adviser and instructor.

# 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) W Growth and development of the human being from birth through maturity. Special emphasis upon growth of the head and dentition.

#### DENT

410 Abnormal Growth and Development (1) Continuation of 401.

#### DENT

#### 420, 421 Dental Auxiliary Utilization (1,1) W,Sp

Combined seminar, lecture, and clinical course designed to provide instruction in the training and utilization of auxiliary personnel in the practice of dentistry. (Formerly 471.)

#### DENT

430 General Practice Seminar (2-2-2) AWSp Combined lecture-seminar courses devoted to treatment planning and management of the problem periodontal patient in the general practice environment. Discussion directed toward the effective integration of periodontal therapy with restorative dentistry, and to the establishment of effective recall and maintenance programs in the private practice office. Prerequisites, 420, 472.

#### DENT

#### 432, 433, 434 Team (1,1,1) A,W,Sp Strand

Dental students skilled in four-handed, sitdown dentistry are given didactic training and practical experiences in the management and optimum utilization of multiple, expandedfunction auxiliaries, and in the management of personnel and resources necessary to operate an expanded-function dental practice.

#### DENT

470 Clinical Orientation (0) A Course for third-year students prior to the beginning of Autumn Quarter. It is designed to familiarize the student with clinical equipment and procedures and initiates the transition of thought from technical and laboratory methods to clinical application of them. It includes student exercises on each other in prophylaxis, rubber dam applications, and local anesthetic injections in preparation for treatment of patients.

#### DENT

490 Special Studies in Dentistry (2, max. 4) AWSp

Series of courses offered by the various de-partments, from which students may elect study in areas of special interest to them. These courses include subject matter applicable to all phases of dentistry, and may be applied toward the major requirement for the degree of Master of Science in Dentistry. Offered on credit/no credit basis only.

# **Courses for Graduate and Certificate 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

#### 500 Principles of Personality Development . (2) A

Yundelis

Discussion of the principles of personality development and the problems most commonly met. Consideration given to the physiological, psychological, and cultural factors from infancy through old age. For nonmedical students. Prerequisite, senior or graduate student standing.

#### DENT

#### 510 Applied Osteology and Myology of the Head and Neck (2) A

Detailed study as a background for the study of the growth and development of the head and for cephalometric roentgenogram interpretation. (Department of Orthodontics)

#### DENT

#### 511 Roentgenographic Cephalometry (2) A Moore

Basic principles, history, and techniques of roentgenographic cephalometry. (Department of Orthodontics)

#### DENT

#### 512, 513 Growth and Development (2,2) W,W Joondeph, Keller, McNeill

Review of the various methods of studying human growth, and special emphasis upon growth of the head, and study of the development of the dentition from birth through maturity; analysis of the factors that produce normal occlusion and malocclusion. Prerequisites, 512 and 513. (Department of Orthodontics)

#### DENT

#### 514 Genetics and Its Applications to Dental Problems (2) W Cohen, Moffett

Review of methodology in twin studies, popula-

tion genetics, and karyotypic analysis, using examples in dental research. Survey of literature on inherited dental traits.

#### DENT

515 Morphogenesis of Skeletal Tissue (3) SpS Review of development of connective tissue, cartilage, bone and joints, including the differentiation, growth, remodeling, aging, and degenerative changes.

#### DENT

#### 518 Scientific Methodology in Dental Research (2) Sp

(1) Review of the scientific method. (2) Evaluation of dental literature. (3) Discussion of proposed master's degree research projects. (4) Procedure in scientific writing. (5) Formulation

# DENTISTRY

and discussion of hypothetical research projects related to orthodontics.

#### DENT

520. Data Interpretation and Epidemiology in Dentistry (3) AWSp Erickson

Principles of research design and epidemiology as they pertain to interpretation of the scientific literature in dentistry. The principles of biostatistics are studied independently with the aid of programmed material.

### DENT

# 532, 533, 534 Basic Science (3,4,4)

Seminar-lecture discussion course dealing with the structure, physiology, chemistry, and microbiology of the dental and periodontal tissues. Correlations with the needs of the clinical specialties are made wherever possible.

#### DENT

#### 560 Dental Photography (2) 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

# 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.

#### DENT

# 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.

#### DENT

#### Seminar in Occiusion (2) A 588 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.

#### DENT

Masticatory Functional Analysis and 589 Occlusal Adjustment (2) W Yuodelis

Continuation of 588. Prerequisite, 587 or 588.

#### DENT

700 Master's Thesis (\*)

### **ENDODONTICS**

#### ENDO

Introduction to Endodontics (2) Sp 410 Natkin

Lecture course dealing with the differential

diagnosis and the treatment of pulp pathosis and associated periapical pathosis.

#### ENDO

420 Endodontics (1) W

Natkin Lecture course dealing with diagnosis and treat-

ment of impact injuries to teeth; treatment of endodontic emergencies; surgical management

# of endodontic problems.

#### ENDO

#### 421 Clinical Management of Endodontic Treatment Problems (1) Sp Harrington

Management of a variety of technical problems frequently encountered in the treatment of endodontic cases. Required for third-year dental students.

#### ENDO

448 Directed Studies in Endodontics (\*) Students and faculty with common academic interests pursue them together within the cur-riculum 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 an anterior, bicuspid, and molar tooth.

#### ENDO

#### 471 Endodontic Technic (4) A Natkin

Lecture-laboratory course in root canal therapy in terms of present-day concepts, with emphasis on a definite simplified technique. Treatment of extracted teeth as practice for clinical cases. Prerequisite, 410.

#### ENDO

475 Clinical Endodontics (6) S Continuation of 470. Prerequisite, 470.

#### **ENDO**

Advanced Clinical Endodontics (1-1) 480 AW

In addition to conservative treatment of several endodontic cases, the student performs periapical surgery and at least one minor operation such as bleaching.

#### **ENDO**

485 Advanced Clinical Endodontics (6) S Continuation of 480. Prerequisite, 480.

#### ENDO

#### 497 Directed Studies in Endodontics (\*) AWSD

Course permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Prerequisites, permission of class adviser and instructor.

# **Courses for Graduates Only**

# ENDO

501 **Advanced Endodontic Diagnosis and** Treatment (2) A

Harrington, Natkin Current concepts are presented and discussed

relating to the diagnosis and treatment of pulpal and periapical pathology. Criteria for evaluation of success or failure of root canal therapy.

#### ENDO

#### 504 Advanced Endodontic Treatment Planning

Harrington, Natkin

Diagnosis and treatment of acute symptoms of dental origin, surgical endodontic therapy, traumatic dental injuries, and the relationship between periodontal and pulpal pathology, the differential diagnosis, and appropriate treatment planning.

#### **ENDO**

# 525 Physiologic Bases of Dental Science (3) 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 Physiology and Biophysics as Physiology and Biophysics 506. Prerequisite, permission.

#### ENDO

### 526, 527, 528, 529 Advanced Topics in Endodontics (2,2,2,2)

Van Hassel

Use of the bacteriologic culture, resorptive phenomena, differential diagnosis of oral pain, evaluation of case success, and replantation are representative topics. Course method includes critical evaluation of presently accepted concepts and the better known literature upon which they are based, followed by study of the applicability and validity of the biologic concepts involved and of the historical development of present dicta.

#### ENDO

#### **Calcification of Oral Tissues (2)** 530 Van Hassel

Present concepts of the formation of dentin, enamel, cementum, and bone; role of vitamins. PTH, Calcitonin, serum Ca++ and PO<sub>4</sub>-- levels, inhibitors, and phosphatases in matrix and crystal deposition; calcification, dissolution, and repair. Prerequisite, permission.

#### ENDO

#### 535 Microbiological Aspects of Endodontic Therapy (2) Sp Zeldow

Seminar discussion of areas of microbiology of particular significance to the field of endodontics. Required for endodontics graduate students. Prerequisite, permission for nonendodontics dental graduate students.

#### ENDO

#### 546, 547, 548 Clinical Endodontics (3.4.4) Harrington

The clinical diagnosis and treatment of the pulpless tooth.

#### ENDO

#### 549, 550, 551 Clinical Endodontics (3,4,4) Natkin

The clinical diagnosis and treatment of the pulpless tooth. Prerequisites, 546, 547, 548.

#### ENDO

#### 576, 577, 578 Endodontic Seminar (2,2,2) Natkin

Continuous weekly seminar devoted to review of endodontic and related literature and to discussion of research methods.

#### ENDO

579, 580, 581 Endodontic Seminar (2,2,2) Harrington

Continuous weekly seminar devoted to review of endodontic and related literature and to discussion of research methods. Prerequisites, 576, 577. 578.

#### ENDO

#### 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)

Natkin 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) Ŵ,W

Harrington

Weekly seminars devoted to an examination of general problems of teaching and learning and specific problems of endodontics teaching. Prerequisite, 597 for 598.

#### ENDO

#### 600 Independent Study or Research (\*) Van Hassel

Investigative program in one of the basic sciences under the direction of the departmental faculty. Prerequisite, permission.

For other graduate course offerings see individual department listings.

### **ORAL BIOLOGY**

#### ORALB

301 Dental Caries (1) Sp Robinovitch

Etiology, pathogenesis, histopathology, epidemiology, and principles of prevention of dental caries. Considerable time is devoted to the formation, composition, and 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) AW

Development and microsopic 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, perio-dontal membrane, alveolar bone, oral mucous membrane, maxillary sinus and temporomandibular articulation. Required for dental students. Prerequisites, course in general mammalian histology or equivalent and permission.

#### ORALB ·

401 Dental Caries (1) W

Series of lectures outlining the morphological, biochemical, and microbiological aspects of dental plaque and caries. Required for dental students. Prerequisites, course in general biology and permission.

#### ORALB

# 405 Oral Pathology for Dental Hygienists (2)

Study of diseases and abnormalities of the hard and soft tissues of the oral cavity. Prerequisite, Pathology 310.

#### ORALB

## 410 Oral Pathology (5) Sp

Survey of the diseases of the oral-facial regions in lecture and laboratory sessions. Among the conditions discussed are diseases of teeth and their supporting structures and diseases of the oral and paraoral soft tissues and bones. Considerable effort is expended in developing an understanding of the abnormal processes. Correlations between clinical findings, etiologic factors, and histopathologic features of each of the diseases are stressed. Attendance in the laboratory is required. The course is required of all dental students and is open to other qualified students by permission.

#### ORALB

448 Directed Studies in Oral Biology (\*) See Community Dentistry 449 for course description.

#### ORALB

#### 449 Undergraduate Research Topics in Oral Biology (\*)

Individual research on topics selected in collaboration with a faculty member. Prerequisite, permission.

#### ORALB

#### 497 Directed Studies in Oral Biology (\*) **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 Directed Studies 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.

#### ORAL'B

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 pro-cedures deemed relevant and essential to establishing a diagnosis are discussed. Similar approaches are followed when radiographic findings, the results of surgical exploration, or the consequences of treatment contribute to, or are found to be necessary for, the establishment of a radiographic, surgical, or therapeutic diagnosis.

#### ORALB

#### 540 Oral Biology Seminar (1-3, max. 10) AWSp

discussion of current Presentation and 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

# DENTISTRY

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 plague 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; offered 1974-75.)

#### ORALB

#### 581 Biological Structure and Function of Exocrine Glands (1-3) A

Initiation, differentiation, and development of exócrine glands in a number of mammalian species. Exocrine tissues, such as pancreas and salivary glands, are emphasized, but examples of other exocrine systems are presented. Stress placed on the relation of the structural and ultrastructural characteristics of exocrine glands to their varied functions. Prerequisite, permission; basic course in introductory biology (e.g., Biology 212) or human biology (e.g., Biological Structure 330 or Human Biology 411) recommended. (Offered alternate years; offered 1974-75.)

#### ORALB

## 582 Physiology of Exocrine Glands (3) W

The autonomic innervation of salivary glands, and action of drugs, changes in blood flow and metabolism during activity as well as the processes involved in the transport of water and electrolytes through the glands are explored in depth. Prerequisite, permission; basic knowledge in general physiology recommended. (Offered alternate years; offered 1974-75.)

#### ORALB

583 Biochemical Aspects of Secretion (2-3) Sp Biochemical aspects of the secretory process, including biosynthesis, intracellular transport and expulsion of proteins and glycoproteins from the cell. Exocrine tissues such as pancreatic and salivary glands are emphasized, but course material includes examples of nonexocrine secretion (e.g., of collagen, plasma proteins, thyroglobulins, insulin, etc.). Prerequisites, Biochemistry 406 or its equivalent and permission; Biology 581 recommended. (Offered alternate years; offered 1974-75.)

#### 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 (2) 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) 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

#### 413 Advanced Radiographic Interpretation (1) A

Patton, Soltero, Somers, Truelove Radiographic interpretation of the structures of the head and jaws as observed by panoramic, lateral head film, and other extraoral techniques. The radiographic appearance of pathology as seen on extraoral films. Prerequisites, 400, 550.

### ODTP

#### 420 Oral Medicine (2) W

Fundamental procedures in oral diagnosis; preparation for advanced instruction.

#### 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 disease: 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) WSp

Biophysical, clinical, and interpretative aspects of dental X-ray procedures, with practical application in the completion of acceptable fullmouth surveys on patients.

#### ODTP

#### 470 Clinical Oral Diagnosis and Treatment Planning (1-1) 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

#### 475 Clinical Oral Diagnosis and Treatment Planning (6) S

Continuation of 470.

#### ODTP

#### 480 Advanced Clinical Oral Diagnosis and Treatment Planning (1-2) AW

Advanced instruction in diagnosis and in the examination and handling of patients. Students are in block assignment and perform radiographic surveys, oral diagnosis, and treatment plans for prospective patients.

#### **ORAL MEDICINE**

#### **Courses for Graduates Only**

#### ORALM

#### 500 Advanced Diagnostic Techniques (3) Truelove

Advanced diagnostic procedures used to identify oral and perioral diseases. Included are in-depth discussions of history analysis, methods for psychologic evaluation, soft and hard tissue diagnostic procedures, neurologic, salivary gland, and other tissue analyses requiring special procedures.

#### ORALM

#### 530, 531, 532, 533, 534, 535 Hospital Oral Medicine (3,3,3,3,3,3)

Truelove

Clinic, oriented to the hospital practice of oral medicine, deals with examination and nonsurgical therapy of hospital patients. The conditions treated include primary oral diseases, oral manifestations of systemic diseases, and oral defects resulting from medical treatment of serious systemic disease.

#### ORALM 546 Clinical Oral Medicine (3, max. 21) Truelove

Clinic involving the diagnostic evaluation of patients with difficult and unusual oral diseases. The student diagnoses and treats the patient. Types of therapy include medications and chemical agents, functional physical therapy, and counseling.

#### ORALM

548 Oral Medicine Clinical Conference (1, max. 7)

Truelove

Clinical conference in which diagnostic data concerning patients seen in the oral medicine clinic are presented for evaluation. When possible, the patient is present with laboratory findings, radiographs, and the results of special tests.

#### ORALM

#### 560, 561, 562 Oral Medicine and Therapeutics (5,5,5)

Truelove

Lecture course directed toward the presentation and discussion of oral diseases and oral manifestations of systemic disease. Primarily the clinical manifestations' relationship to generalized disease processes and patient management with in-depth discussions of therapy.

#### ORALM

#### 576 Oral Medicine Literature Review Seminar (2, max. 6)

Truelove

Seminar analyzes the recent literature concerning the area of oral medicine, diagnosis, and therapy for oral disease.

#### ORALM

#### 580 Advanced Radiographic Techniques (2) Truelove

Seminar and clinic concerning radiographic procedures necessary for visualization of soft and hard tissue structures of the maxilla, sinuses, temporomandibular joint, and mandible and soft tissue structures approximating the oral cavity. Emphasis placed on extraoral and special techniques.

#### ORALM

585 Advanced Radiographic Interpretation (3) Truelove.

Lecture, seminar, and clinic dealing with interpretation of routine and special radiographs of the oral and perioral region. Emphasis placed on the radiographic characteristics of degenerative, neoplastic, metabolic, developmental, and infectious processes. In the clinical component, the student interprets films taken of patients suspected of having radiographically apparent oral diseases.

#### ORALM

#### 590, 591, 592 Clinical Oral Diagnosis Teaching (1,1,1)

Truelove

Clinic designed to give the student experience and instruction in the teaching of clinical oral diagnosis. Treatment of emergency dental problems as well as routine and special diagnostic procedures is emphasized.

#### ORALM

#### 600 Independent Study or Research (\*) Truelove

Clinical research in which the student selects a clinical project dealing with the diagnosis and/or nonsurgical treatment of oral disease, develops a protocol, and, after faculty approval, completes the project.

# **ORAL SURGERY**

#### 05

#### 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.

#### 05

#### 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.

#### **0 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.

#### **0 S**

431 Hospital Dentistry (1) Sp Anderson

Introductory course presenting hospital procedures and protocol and specific patient types. Prerequisite for 480.

#### 05

#### 475 Clinical Exodontia (6) S Continuation of 470. Prerequisite, 470.

#### 0 S

**480** Hospital Dentistry (1-1-1) AWSp Clinical experience that puts into practice the material presented in 431. The student is involved in hospital procedures and protocol and in dental care of the hospital patient. Prerequisite, 431.

#### O S 485 Clinical Oral Surgery (6) S

Continuation of 480. Prerequisite, 480.

#### **0 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**

#### **OS**

#### 500, 501, 502 Oral Surgery Seminar (2,2,2) A,W,Sp

Hooley

Weekly seminar devoted to the discussion of oral surgery and related problems from basic science, medical, diagnostic, therapeutic, opera-tive, and postoperative aspects. Subjects such as hemorrhagic diathesis, antibiotic therapy, facial trauma, neurologic disorders, developmental deformities, soft tissue surgery, maxillary sinus pathology, pharmacology of general anesthetics, bone physiology, and tracheotomy are discussed. Prepared presentations are given by the graduate students. Guest lecturers are invited to discuss their specialties in the fields such as ophthalmology, otolaryngology, neurosurgery, and general surgery, as they are related to oral surgery. Several seminars are held jointly with other departments (Prosthodontics and Orthodontics). Each graduate student attends ninety seminars over the three-year period.

#### OS.

#### 520, 521, 522 Literature Review (2,2,2) A,W,Sp

Hooley, Staff

Survey of the pertinent literature in the field of oral surgery. Current literature is reviewed at the beginning of each session, and following this a participant presents a seminar on topics in oral surgery based on a review of the literature.

#### 08

#### 540, 541, 542 Advanced Oral Surgery Clinic (3,3,3) A,W,Sp *West*

The patient evaluation, clinical diagnosis, treatment plan, operation and management of oral surgery cases that can be operated under premedication and local anesthesia on an outpatient basis are accomplished. Problems such as biopsy, benign tumor, cyst, vermillionectomy, peripheral neurectomy, vestibular extension, removal of hyperplastic tissue, exostosis, torus, foreign body, supernumerary impacted teeth, and other procedures are included.

0 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.

#### 05

#### 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, Pedodontics 460.

#### ORTHO

#### 420 Orthodontics (2) A

Brief historical review of the etiology of malocclusion; classification and analysis of cases; growth anomalies, as well as deformities and their evaluation; the temporomandibular joint; the mandibular position, as related to orthodontic case analysis; treatment planning; types of appliances and their uses; retention; the ultimate outcome of orthodontic treatment.

#### ORTHO

449 Directed Studies in Orthodontics (\*) See Community Dentistry 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

546, 547, 548, 549, 550, 551, 552 Clinical Orthodontics (4,\*,\*,\*,\*,\*,\*) Techniques of contruction and manipulation

of the edgewise arch mechanism; application of the techniques in the treatment of malocclusion. Treatment of patients begins in the seccond quarter. Each course is prerequisite to the following course.

#### ORTHO

#### Surgical Orthodontic Diagnosis and 560 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 Van Ness

Seminar and clinic for orthodontic, periodontic, and restorative dentistry graduate students in comprehensive, integrated diagnosis, treat-ment planning, and treatment of the dental problems of the actual activity. 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 Peterson

Emotional development of the child and its implications in pedodontic procedures. Space maintenance, the interception of incipient malocclusion, and clinical management of oral habits.

#### PEDO

#### 460 Pediatric Dentistry (2-2)

Principles of pediatric dentistry with orthodontic minor tooth movement.

# PEDO

#### **Introduction to Clinical Pediatric** 461 Dentistry (1)

Series of lectures on the child in the dental environment combined with initial treatment of the child patient.

PEDO

#### 470 Clinical Pedodontics (1-1-1) AWSp

Diagnosis and examination of the child patient. Restorative procedures in primary and mixed dentitions, with special emphasis on application of the rubber dam.

#### PEDO

475 Clinical Pedodontics (6) S Continuation of 470. Prerequisite, 470.

#### PEDO

480 Advanced Clinical Pedodontics (1-1-1) AWSp

Diagnosis and treatment planning, with emphasis on preventive dentistry. Complete operative procedures, including vital pulp ther-apy, construction of space maintainers, bite planes, and restoration of fractured anterior teeth.

#### PEDO

485 Advanced Clinical Pedodontics (6) S Continuation of 480. Prerequisite, 480.

#### **Courses for Graduates Only**

#### PEDO

500, 501, 502, 503, 504, 505 Pedodontics Seminar (2,2,2,2,2,2,2) 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 Clinical **Pedodontics (\*,\*,\*,\*,\*,\*,\*,\*)** Davis, Hansel, Law

Advanced clinical practice. Assignment of se-lected cases, with student responsibility for complete examination, diagnosis, and treatment planning including completion of the case. The use of appliances to effect limited tooth movement in cases of space closure and the application of the Broadbent-Bolton cephalometer in diagnosis and treatment.

#### 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. (Formerly 401.)

#### PERIO

#### 411, 412 Introduction to Periodontal Therapy (1,1) W,Sp

Lecture. See also 461, 462. (Formerly 460.)

#### PERIO

#### 420 Periodontal Therapy (1) A Heins

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.

#### PERIO

#### 430-431 Periodontal Therapy and Treatment Planning in General Practice (1-2) A,W

Lecture-seminar course with focus on the treatment planning and management of the problem periodontal patient in the general practice environment. Discussions on the effective integration of periodontal therapy with restorative dentistry, and of the establishment of effective recall and maintenance programs in the private practice office. Prerequisites, 420, 472.

#### PERIO

#### 449 Directed Studies in Periodontics (\*) See Community Dentistry 449 for course description.

#### PERIO

460 Basic Periodontal Instrumentation (1) Combined lecture and clinical experience in diagnosis, treatment planning, and performance of nonsurgical and elementary surgical procedures. The indication for, application of, and technical performance of, various procedures and their integration into dental practice are discussed. (Formerly 450.)

#### 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. (Formerly 470.)

#### PERIO

475 Clinical Periodontics (6) S Continuation of 470. Prerequisite, 470.

#### 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.

#### PERIO

481 Honors Course in Periodontics (0-0-3) AWSp

#### Heins

Intensive clinic-seminar experience in periodontics for selected fourth-year students. May be taken instead of 480.

#### PERIO

485 Advanced Clinical Periodontics (6) S Continuation of 480. Prerequisite, 480.

## PERIO

#### 497 Directed Studies in Periodontics (\*) AWSp

Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Prerequisites, permission of class adviser and instructor.

# **Courses for Graduates Only**

#### PERIO

#### 530, 531, 532, 533 Hospital Periodontics (2,2,2,2)

Prepares graduate students in periodontics to practice in hospital situations. Experience in operating with nitrous oxide 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) W Hall

Examination and therapy techniques on untreated and treated periodontal patients for graduate dental hygienists. Clinical training in cooperation with, and under the direction of, periodontics graduate students and faculty. Student must have a bachelor's degree and pass a preclinical examination.

#### PERIO

546, 547, 548, 549, 550, 551 Clinical Periodontics (2-6,2-6,2-6,2-6,2-6,2-6) Schluger

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, 562, 563 Periodontal Case Management (1.1.1)

Didactic presentation of clinical periodontics to provide a comprehensive view of the field and a grasp of modern therapeutics.

#### PERIO

#### 570 Review of Current Literature (2)

Weekly seminar-discussion devoted to literature published within the past three years and confined to material not covered in previous subject matter. Prepares the graduate student for oral and written examination for certification by the American Academy of Periodontology.

#### PERIO

#### 576 Review of Literature (2, max. 14) Ammons

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)

Schluger 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) Schluger

Weekly seminar utilizing the case review method and dealing with the treatment of moderate to advanced periodontal disease.

#### PERIO

591, 592, 593 Clinical Practice Teaching (1,1,1)

Ammons

Supervised experience in teaching clinical periodontics to undergraduate dental students. Prerequisites, 546, 547, 548, 576, 577, 578.

#### PERIO

#### 599 Pathology of the Periodontium and Contiguous Structures (3) W Page

Seminar covers in depth the tissue alterations noted in periodontal disease and the concepts of the nature of the underlying lesion. Prerequisites, Pathology 445 and 500, or permission.

#### PERIO

600 Independent Study or Research (\*) Ammons, Schluger

An investigative program in one of the basic sciences under the direction of the departmental faculty. Prerequisite, permission.

# PROSTHODONTICS

#### PROS

#### 410 Removable Partial Denture Design (2) A Frank

Lectures in the basic principles of removable partial denture design; more advanced designs are discussed in seminars; certain technical aspects of design procedures are done in the classroom.

#### PROS

#### 420 Management of Immediate Denture Patients (1) A

Bolender

Lecture course describing and illustrating the clinical management of immediate denture patients (typical and overdenture).

#### PROS

421 Special Topics in Prosthodontics (1) ASp Lecture describing and illustrating the following topics: reline procedure, management of troublesome patients, maxillofacial prosthesis, and quality-control problems in private practice.

#### PROS

449 Directed Studies in Prosthodontics (\*) See Community Dentistry 449 for course description.

#### PROS

460 Introductory Complete Denture

Prosthodontics (6)

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) 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) A

Clinical course involving the diagnosis and management of completely edentulous and partially edentulous patients. Removable partial dentures and immediate dentures are fabricated. In addition, follow-up care is provided for patients previously treated.

#### PROS

475 Clinical Prosthodontics (6) S Continuation of 470. Prerequisite, 470.

#### PROS

#### 480 Clinical Prosthodontic Maintenance (1) A

Clinic involving the relining or rebasing of dentures previously made at the University of Washington.

#### PROS

**485** Advanced Clinical Prosthodontics (6) S Continuation of 480. Prerequisite, 480.

#### 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

Bolender, Swoope Comprehensive seminar-clinical course devoted to the diagnosis and treatment of the completely edentulous patient. Emphasis is placed on management of patients who present difficulties in treatment.

#### PROS

#### 561 Immediate Dentures (4) W Bolender, Swoope

Seminar-clinical course concentrating on those factors that are peculiar to the fabrication of immediate dentures. Emphasis is placed on the management of transition from natural to artificial dentition. This course provides an opportunity for the application of the principles covered in 560.

#### PROS

#### 562 Removable Partial Dentures (4) Sp Bolender, Swoope

Seminar-clinical course devoted to the diagnosis and treatment of the partially edentulouspatient requiring the fabrication of a removable partial denture. The study of supporting tissues and their physiologic responses is included.

# DENTISTRY

#### PROS

#### 563 Obturators and Speech Appliances (2) 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

**Obturators and Speech Appliances (2)** 568 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 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 fulltime faculty.

#### PROS

#### 580 Prosthodontic Dental Materials (2) SpS Swoope

A study of common materials utilized in the fabrication of dental appliances. Emphasis is placed on resin systems and various preciousand base-metal alloys.

#### PROS

#### **Advanced Clinical Prosthodontics** 585 (4, max. 16) AWSpS Swoope

Continuation of 560, 561, 562. Seminar-clinical course covering recent and advanced phases of prosthodontics.

PROS

Independent Study or Research (\*) 600 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

#### 411 Restorative Dentistry Technic (3) Sp Brooks

Lecture-laboratory course offering experience in instrumentation and manipulation of restorative materials. Special emphasis on dental amalgam and composite resin restorations. Prerequisite, 410.

#### **RES D**

#### 420, 421, 422 Restorative Dentistry (1,1,1) A,W,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

Discussion of various methods available for managing extensive restorative cases. Variations in anterior bridges, combinations of posterior restorations, and concepts of occlusion related to such problems.

#### RES D

# 449 Directed Studies in Restorative Dentistry

Morrison, Staff

See Community Dentistry 449 for course description.

#### RES D

# 450 Dental Materials (2) A

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 (4,4) W,Sp

Instruction in the use of various restorative materials for the restoration of diseased or missing parts of the natural dentition. Emphasis placed upon occlusal function, tooth preparation, manipulation of each of the materials and upon the requirements for each type of restoration in order that it accommodate the demands of the oral environment and contribute to the health of the dentition. Preparation for subsequent clinical courses in restorative dentistry.

#### **RES D**

#### 460 Restorative Dentistry (4)

Continuation of 455 with emphasis on extracoronal restorations.

#### **RES D**

#### 461 Restorative Dentistry (6)

Continuation of 460 with the addition of some clinical application of basic restorative procedures. Prerequisite, permission.

#### RES D

#### 462 Restorative Dentistry (6) Sp

Continuation of 461 with emphasis on the clinical application of fundamental restorative procedures.

#### **RES D**

#### 463 Preclinical Analysis and Adjustment of Occlusion (2) A

Background information and techniques required to enable students to manage the adjustment of occlusion for their patients. The technique of adjustment is related to both orthodontic and restorative means by which occlusion may be altered. Selected cases representing a variety of problems involving occlusal adjustment, and this necessary adjustment is carried out on mounted casts, following the same principles that would be applied clinically. The laboratory involves the adjustment of casts for selected patients.

#### **RES D**

#### **Restorative Dentistry (4-4-4) AWSp** 470 Morrison

Designed to provide training in the fundamental procedures required to restore teeth that have been damaged by caries or trauma. Instruction also includes the restoration of missing teeth with short span fixed prostheses and the treatment of occlusal discrepancies that may relate to these discrepancies.

#### **RES D**

#### **Clinical Crowns and Fixed Partial** 475 Dentures (6) S

Prerequisite, 470.

#### **RES D**

### 480 Clinical Practice (3-3-3) AWSp

Clinical course directed toward the integration of restorative therapy with other treatment required for the group of patients selected to fulfill the clinical graduation requirements. Includes the restoration of extensively involved teeth and the replacement of teeth, particularly anteriors, with fixed restorations. Prerequisite, 470.

#### RES D

#### **Advanced Clinical Crowns and Fixed** 485 Partial Dentures (6) S

Prerequisite, 480.

#### RES D

#### **Directed Studies in Restorative Dentistry** 497 (\*) 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

#### Yuodelis, Staff

Continuous weekly seminar devoted to a review of restorative and related literature, and discussion of teaching methods, philosophy of teaching and treatment. (Offered in odd-numbered years.)

#### **RES D**

571 Resin and Other Interim Restorations (2) Indications and contraindications, physical properties, rationale and techniques of manipulation, cavity preparation and tissue response.

#### RES D

## 575 Gold Foil Restorations (4)

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**

#### Gnathology (2) AWSp **590**

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**

#### **Restorative Technique Practice Teaching** 591 (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**

# **EDUCATIONAL** ADMINISTRATION

#### EDADM

430 Public School Administration (3) Introduction to theories and practices of administering public schools; designed for persons who are not majoring in educational administration. Structure of school organizations, supervision of personnel, planning problems encountered at various levels, interpretation of the school program to the public, formation of policies, decision making, administration of the instructional program, finance and business management, school housing, appraisal of the school system, and leadership in democratizing school administration.

#### EDADM

#### 440 Social Power in the Educational Environment (3)

Ostrander

Factors contributing to the development and use of social power: conflict between organizational expectations and individual needs; selfesteem; realistic and unrealistic conflict; the dynamics of collective action. Consideration is also given to the identification of concepts and practices that can reduce organizational conflict:

#### EDADM

#### 499 Undergraduate Research (\*)

For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Educational Administration, endorsed by the faculty 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

Theory of the process of supervising school personnel, including an analysis of the techniques of supervision, theory of leadership and group process, interpersonal relations, and evaluation of teacher effectiveness. Prerequisites, 527, master's degree in educational administration, or equivalent.

# EDADM 527 Educational Administration and Supervision (3)

Bolton

Emphasizes the human elements of educational administration, including such topics as leadership, selection and orientation of personnel, small-group processes, staff utilization, administering the curriculum, supervision and control processes, differences and conflict. Prerequisite, graduate standing.

#### EDADM

#### 528 Educational Administration and Supervision (3) Andrews

Theoretical bases and practical integration of schools within the school/environmental context. Topics include schools as complex organizations, schools as open systems interacting with other open systems, power, and consensus mechanisms. Prerequisite, graduate standing.

#### **EDADM**

#### 529 **Educational Administration and** Supervision (3)

Straver

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**

#### Seminar in Administration: Finance (3) 531 Straver

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 rela-tions. 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, communica-tion, role analysis, and dynamics of groups are studied through use of cases and simulated situations. Prerequisite, master's degree in educational administration or equivalent.
# EDUCATION

### 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, 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. Halftime work in a school district or districts for one, two, or three quarters, depending upon the student's previous experience. Supervision by staff members of the College of Education and the superintendent of schools or school principal in the selected school district. Prerequisites, completion of all other requirements for administrator's credential and permission.

### EDADM

### 537 Special Problems in Educational Administration and Supervision (3, max. 9)

Anderson, Andrews, Ostrander, Strayer Readings, lectures, and discussions of topics of special and current interest to school administrators or supervisors. Reports on new developments in research. Topics vary each year. Prerequisites, master's degree in educational administration and permission.

### EDADM

### 538 School-Community Relations (3) Andrews, Ostrander, Strayer

Examines the dynamics of the interface between the public schools and the community. Special attention is given to the findings of research in relation to school-community power, types, and organizational influences. Prerequisites, 528, master's degree in educational administration or equivalent, or consent of instructor.

### EDADM

### 539 The Law and Education (3) Andrews, Ostrander

Examination of court cases associated with the rights of individuals and groups in educational organizations. Attention is given to the understanding of administrative due process requirements and to the growing body of administrative law affecting student and personnel management. Prequisite, 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 the Office of Educational Administration in the College of Education. A report or paper setting forth the results of the investigation is required. Prerequisite, permission.

### EDUCATIONAL CURRICULUM AND INSTRUCTION

#### EDC&I

132 Spanish for the Elementary School (5) Practice in the basic language skills is combined with the demonstration and analysis of methods and techniques appropriate to the Foreign Languages in Elementary Schools program. Emphasis is given to the language structures and vocabulary that normally occur in elementary school Spanish. Offered jointly with the Department of Romance Languages and Literature as Spanish 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. (Formerly 200.)

### 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. (Formerly 201.)

### 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. (Formerly 300.)

### EDC&I

### 303 Industrial Education: Fundamentals of Woodwork (3)

Baily

Hand-tool processes; elementary machine operations; methods of assembling and fastening; simple wood finishing. (Formerly 204.)

### 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. (Formerly 202.)

### 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.



309 Industrial Education: General Metalwork (3) Baily

Tools, materials, and processes used in sheet metal, forging, casting, bench metal, orna-mental iron work, welding, machining, and finishing of metal. (Formerly 206.)

### EDC&I

### 311 Industrial Education for Elementary Teachers (5) Bailv

Planning and preparing a representative unit in some area of the elementary school program, with particular emphasis on those parts that involve construction activity. Development of basic skills in the use of common hand tools. Related information about industrial technology and its place in our society is included. (Formerly 302.)

### EDC&I

#### **General Shop for Occupational** 312 Therapists (5)

Baily

Introduction to the common tools, materials, and processes used in occupational therapy. Freehand sketching, both pictorial and arthographic; working drawings and print reading. (Formerly 203.)

### EDC&I

313 Industrial Education: Basic Woodworking for Occupational Therapists (5) Bailv

Hand-tool processes, elementary machine operations, safety practices, problem solving and planning, methods of assembling and fastening, simple wood finishing. (Formerly 303.)

### EDC&I

#### Business Education Clinic (1-15, max. 15) 314 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. Pre-requisites, basic skills in typewriting, shorthand, office machines operation, office procedures, and accounting; Business, Government, and Society 101 and 200; Accounting 210 and 220; Economics 200 and 201.

### EDC&I

315 The Teaching of Business Education: Typewriting, Shorthand, Office Practice, and Transcription (4) Briggs, Brown, Frerichs

Prerequisites, EDPSY 304 and Secretarial Studies 112.

### EDC&I

316 The Teaching of Business Education: Accounting, Office Machines, Business Arithmetic, and General Business (4) Briggs

Prerequisites, EDPSY 304 and 9 credits in accounting.

### EDC&I

320 Organization of School Programs in Communication Disorders (3)

Study of the organization and management of school programs designed to alleviate disorders of communication, K-12. Special emphasis on field experiences. Open only to majors in communication disorders. Prerequisites, EDSPY 304, Speech 350 and 351 or 391.

### EDC&

321 Health in the Elementary School (2) Mills

Health procedures and techniques for meeting health needs and problems of elementary school children, including screening, observation, emergency care, etc.

### EDC&I

### 324 Physical Education in the Elementary School (3)

Special methods and procedures for planning and conducting the physical education pro-gram 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 av-erage, EDPSY 304 and 308, which may be taken concurrently, 40 home economics credits, and permission.

### EDC&I

328 Methods of Teaching for Institution Administration Students (3) Granberg

Prerequisites, junior standing and 25 credits in home economics, including Home Economics 307.

### EDC&I

#### 329 **Teaching Foreign Language in the** Secondary School (2)

Basic course in the methods of teaching foreign languages in the secondary school. Prerequisite, EDPSY 304.

### EDC&I

### 330, 331, 332 The Teaching of French (3,3,3) Levis

Elementary, junior high, and senior high em-phases. 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. Pre-requisites, 329, EDPSY 304, and demonstration of language proficiency.

### EDC&I

### 336 The Teaching of German in Secondary Schools (3)

Galt Prerequisites, 329, EDPSY 304, Germanic Languages and Literature 303, or permission.

### EDC&I

Galt

### 337 The Teaching of German in Elementary Schools (3)

Objectives and methods of the FLES (Foreign Languages in Elementary Schools) program. Prerequisites, 329, EDPSY 304, Germanic Languages and Literature 303, or permission.

### EDC&I

### 338 The Teaching of Russian (2) 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) Johnson

Study of the stages of development in the art of the young child as expressed through his creative and mental growth.

### EDC&I

#### The Teaching of Art in the Secondary 341 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

#### **Music in the Elementary School:** 343 Intermediate Grades (3)

For students majoring in elementary education (not open to music specialists). A study of music in the development of children, ages 8 to 12, with attention to musical activity and the growth of related concepts and skills. Prerequisites, EDPSY 304 and Music 119.

### EDC&I

### 344 Materials and Methods of Teaching Chinese (3)

Yen

Methods specifically pertaining to the teaching of Chinese language are discussed. Existing textbooks are reviewed. Each student is required to write a lesson, draw up a teaching plan, and teach a class before the end of the quarter. Prerequisites, 329, EDPSY 304, and CHIN 313, or equivalent.

### EDC&I

#### 345 **Fundamentals of Kindergarten-Primary** Teaching (3)

Methods, materials, and professional practices relevant to teaching young children. Recommended for students planning to teach in the kindergarten and primary grades. Prerequisite, 360.

### EDC&I

### 346 Music in Pre-School and Primary Grade Classrooms (3)

Cooper

For students majoring in preschool and primary education (not open to music specialists). A study of music in the development of children, ages 4 to 8, with attention to musical activity and growth of related concepts and skill. Prerequisites, EDPSY 304 and Music 119.

### EDUCATION

### EDC&I

### 347 Modern Theories and Practices in Early Childhood Education (3) Stevens

Introduction to modern theories and practices in early childhood education presented via classroom lectures and observations in selected schools and agencies. Prerequisite, EDPSY 304 or permission.

### EDC&I

### 348 Language Arts and Social Studies in Early Childhood Education (3) Hirabayashi

Basic course stressing language arts and social studies as related to the development of the young child. The course familiarizes students with effective teaching procedures and learning resources designed to help children learn lan-guage competencies and social awareness within the framework of social studies content.

### EDC&

#### Mathematics and Science in Early 349 **Childhood Education (3)** Hurd

Basic course in science and mathematics instruction emphasizing knowledge and skills in teaching scientific and mathematical processes and concepts to young learners.

### EDC&I

#### 350 **Program Planning in Early Childhood** Education (3)

Allen The theoretical and practical aspects of planning, selecting, preparing, presenting, and su-pervising curricular materials and activities in the prekindergarten are presented. (Course taken concurrently with teaching practicum, 7 credits.)

### EDC&I

### 355 Language Arts in the Elementary School

Hirabayashi, Kittell

Basic course in planning and teaching elementary language arts: listening and speaking, handwriting, spelling, creative and practical writing. Prerequisite, EDPSY 304.

### EDC&I

356 The Teaching of English (3) Smith

Designed to draw together the student's pre-vious 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&

**357** The Teaching of Speech (3) A Special methods course in the teaching of speech at the secondary level. Prerequisites for majors in speech, EDPSY 304, at least 20 credits in speech; for nonmajors, permission.

### EDC&I

### 358 The Teaching of Journalism (3)

For teachers in high schools and junior colleges, or for education students taking first or second areas in journalism. Prerequisites, EDPSY 304, Communications 321 and 325, or permission.

### EDC&I

#### Reading in the Elementary School (3) 360 Baxley, Monson, Sebesta

Basic course in methods, techniques, and materials used in the teaching of reading from the readiness period in the kindergarten-

primary area through the study-techniques of the int EDPSY 304. intermediate grades. Prerequisite,

### 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 Geography 100.

### EDC&I

### 366 The Teaching of Social Studies in Secondary Schools (3) Guise

Application of educational principles and methods to the teaching of social studies on the junior and senior high school levels. Prerequisite, EDPSY 304.

### EDC&I

### 370 Science in the Elementary School (3) Olstad, Smith

Basic course in the teaching of science in the elementary school with special emphasis on the nature of science as a process of inquiry. Pre-requisites, EDPSY 304 and 5 credits in an approved course in science.

### 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. Pre-requisite, 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

Beal, Hurd, Kersh

Examination of the learning and teaching of elementary mathematics (grades K-6), in light of recent theoretical and pedagogical developments. Prerequisites, EDPSY 304 and Mathematics 170.

### EDC&I

### 376 The Teaching of Junior High School Mathematics (3)

Kingston

Emphasis is on understanding of junior high school subject matter; supplementary topics include teaching aids and classroom procedures. Not open to students having credit for 377. Prerequisites, 378, EDPSY 304, Mathe-matics 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.) Pre-requisites, 378, EDPSY 304, Mathematics 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.

### EDC&I

### Selection and Organization of Occupational and Industrial Education 400 Subject Matter (3) Bailv

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) Bailv

To acquaint prospective industrial education teachers with teaching aids, classroom procedures, and problems in the teaching of industrial education courses. Prerequisite, 400 or permission.

### EDC&I

### 402 Instructional Analysis for Industrial **Education Teachers (3)**

Baily

Study of the techniques and procedures used in analyzing instructional areas into their basic elements, and an arrangement of the elements into a teaching plan and sequence for industrial arts and vocational industrial education course.

### EDC&I

### 403 Planning the Industrial Education Facilities (3)

Bailv

Study of the fundamental concepts and principles in planning industrial education areas to produce safe, efficient, and effective teachinglearning 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) Bailv

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)

Bailv

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) Bailv

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.

### 407 Organization and Administration of Industrial Education (3) Baily

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) Baily

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) Baily

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)

Baily

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 selection and organization of teaching content for distributive education. Prerequisite, permission.

### EDC&I

### 413 Coordination of Distributive 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)

Baily

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

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

Objectives and content of office practice and general clerical practice courses; plans for organizing classes and methods of teaching specific machines and subject matter; laboratory study of new inventions in office machines.

### EDC&I

### 417 Materials and Methods of Teaching Gregg Shorthand and Transcription (3) Briggs

Recent research and experimentation in teaching shorthand and transcription are emphasized. Psychology of skill development; comparison of the various methods of teaching shorthand; evaluation of teaching materials; consideration of standards, objectives, and teaching techniques. An advanced course for experienced teachers. (Offered Summer Quarter only.)

### EDC&I

418 Principles and Problems of Business Education (3) Briggs

Objectives, history, trends, and issues of business education; federal participation in vocational education; economic, occupational, and population trends and their implications in business education; leaders in business education; research and problems.

### EDC&I

419 Materials and Methods of Teaching Bookkeeping and General Business Subjects (3) Briggs

Techniques of teaching bookkeeping and general business subjects; relationship to the curriculum; standards to be achieved; content and organization of the subject matter; tests and teaching materials; new trends in the field; motivational devices; visual aids.

### EDC&I

### 420 Principles of Safety Education (3) Baily

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)

### Boyungs

Progress and problems in modern programs. Offered jointly with the Department of Physical and Health Education as Physical Education 478.

### EDC&I

### 426 Field Training in Health Education (5) Mills

Four and one-half weeks of full-time supervised work experience in the health education division of a local official health agency. Offered jointly with the Department of Health Services as Health Services 426. Prerequisite, permission.

### 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 midmanagement 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 the Department of Romance Languages and Literature as Romance Linguistics 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 the Department of Classics as Latin 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 the Department of Classics as Latin 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.

### 445 Theory and Practice of Kindergarten and Primary Teaching (3)

Systematic treatment of the content, teaching processes, and learning resources appropriate to kindergarten and primary education with particular emphasis on current research and developments. Prerequisite, teaching experience.

### EDC&I

### 455 The Language Arts: Instructional Problems and Practices in the Elementary School (3)

Kittell, Settles

Study of important and recent research in elementary school language arts and consideration of its practical implications for teaching. Prerequisite, teaching experience.

### EDC&I

### 456 Workshop in Instructional Improvement: Language Arts (2-6)

Individual or group study projects on the improvement of instruction in language arts.

### EDC&I

458 Journalism Teaching in the Secondary School (3)

Advanced course in teaching high school journalism. For experienced publications advisers. No credit if 358 or Journalism 375J has been taken.

### EDC&I

### 460 The Teaching of Reading (3)

Baxley, Monson, Sebesta

Improvement of teaching reading in the elementary school, including comprehension and decoding, reading in the content fields, motivation of voluntary reading. Prerequisite, teaching experience or prior course work in the teaching of reading.

### EDC&I

### 461 Supplementary Materials for the Teaching of Reading (3) Monson

Designed to provide acquaintance with, and basis for, evaluation of materials used in the teaching of reading. Basal readers, material from the content areas, recreational reading materials, and supplementary practice materials are examined. Prerequisite, teaching experience.

### EDC&I

### 462 Reading in the Secondary School (3) 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.

### **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 Practices (3)

Banks, Jarolimek, Kaltsounis

Stresses curriculum patterns, instructional procedures, resource materials, and the selection of content in social studies. For elementary and junior high school teachers. Prerequisite, teaching experience.

#### EDC&I

### 466 Social Studies Education: Secondary School Programs and Practices (3) Guise

Stresses curriculum patterns, instructional procedures, resource materials, and a selection of content in social studies for junior and senior high school teachers. Prerequisite, teaching experience.

### EDC&I

### 467 Geography in the Social Studies Curriculum (3)

Discussion of the concepts and content of geography essential to effective social studies curricula. Offered jointly with the Department of Geography as Geography 467.

### EDC&I

### 468 Workshop in Instructional Improvement: Social Studies (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, Bass

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) Obstad

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 the regular K-12 social studies, language arts, and humanities curricula. Special attention is given to teaching about American Indians, Mexican Americans, Black Americans, Asian Americans, Puerto Rican Americans, and white ethnic groups. Prerequisite, 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, Mathematics 101 or equivalent.

### EDC&I

### 477 Improvement of Teaching: Secondary School Mathematics (5)

Exploration of some modern mathematical concepts for the purpose of improving the teaching of secondary school mathematics. Prerequisite, teaching experience.

### EDC&I

### 478 Special Topics in Mathematics for Teachers (2-5, max. 15)

Algebra and geometry for junior high school teachers of mathematics. Offered jointly with the Department of Mathematics as Mathematics 497.

### EDC&I

### 479 Workshop in Instructional Improvement: Mathematics (2-6)

Individual or group study projects on the improvement of instruction in mathematics.

### EDC&I

### 480 Introduction to Learning Resources in Teaching (3)

Hawk, Torkelson

Factors influencing the selection and use of audiovisual resources in instruction.

### EDC&I

### 481 Practicum in Learning Resources (3) Driscoll, Hawk

Design and production of visual and auditory materials for teaching. Prerequisite, 480 or equivalent.

### EDC&I

### 482 Still Photography in Education (3)

Theory and practice in producing still photographs and slides for teaching purposes; camera and darkroom techniques. Producing photographic materials to meet specific learning problems. Prerequisite, 480 or permission.

#### EDC&I

### 483 Educational Film Production (3)

Driscoll -

Basic motion-picture techniques, emphasizing cinematography and editing.

### EDC&I

### 484 Educational Film Production (3) Driscoll

Advanced film techniques, including instructional film design, narration writing, sound editing, and rerecording. Prerequisite, 483.

### 485 Workshop in Instructional Improvement: Learning Resources (2-6)

Individual or group study projects on the improvement of instruction in learning resources.

### EDC&I

486 Screen Education (3)

. Torkelson

Workshop course in screen education for secondary teachers and others interested in the history and esthetics of the motion picture; preparation for teaching about film as a communication medium.

### EDC&I

### 487 Cinematic Animation Techniques (3) Torkelson

For teachers and others interested in understanding animation techniques in educational television and films. Relationships of rhythm, graphic design, and sound. In addition to lecture demonstrations, opportunity is given for experimentation in simple animation and special effects cinematography.

### EDC&I

488 Television in the Schools (3) Dilworth

Television programs to supplement classroom work; the development of the American system of broadcasting; the development and significance of educational television, and the contribution schools can make to broadcasting. Open to nonmajors; not open to graduate students in communications. Offered jointly with the School of Communications as Communications 459.

### EDC&I

### 489 Television Production Workshop for Teachers (5)

Working in University studios under laboratory conditions involving production on-camera methods, teachers learn to present instructional subject matter through television. For those especially who expect to work with television as instructors or as supervisors of school-oriented television activities. Open to nonmajors; not open to graduate students in communications or to students with credit for Communications 361. Offered jointly with the School of Communications as Communications 463.

#### EDC&I

### 494 Workshop in Curriculum Development (1-15, max. 15)

Hunkins

Individual or group work on curriculum development projects in elementary and secondary schools. Prerequisite, 559.

### EDC&I

### 495 Improvement of Teaching (3)

To help teachers (1) understand the physical, psychological, emotional, and social needs of children; (2) adapt instruction to the needs of children; (3) select the approaches and instructional resources that will provide the soundest learning experiences; and (4) in the appraisal of themselves and their work. (Offered only by special arrangement with school districts.)

### EDC&I

### 496 Workshop in Instructional Improvement (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

### 515 Seminar in Business Education (3) Briggs

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)

Stevens

In-depth analysis of current program models for the education of young children, with an emphasis on specification of objectives, practices, and evaluation of model effectiveness. Models emphasized are those developed in this country, but the course also includes a study of models developed in other countries as they have influenced practice here.

### EDC&I

### 521 Problems and Issues in Early Childhood Education (3) Stevens

Study of issues currently facing the field of early childhood education, emphasizing the rationale, impact, and management of childcare programs. Relationship of local child-care programs to state and federal agencies is included. Prerequisite, 520 or permission.

### EDC&I

Stevens

### 522 Practicum in the Training of Early Childhood Instructional Personnel (3)

Directed experience in educational training

conducted in the field. Design and implementation of a training program for early childhood education instructional personnel. Prerequisites, graduate standing and permission.

### EDC&I

### 524 Seminar in Teacher Education (3) W Foster

Focus on recent trends, issues, and proposals for future development in teacher education and certification. Prerequisite, permission.

### EDC&I

### 556 Elementary School Curriculum (3) Hunkins, Kaltsounis

Description and analysis of current curriculum practices, with particular emphasis on the interrelationships and dimensions of content, organization, methods, evaluation, trends, and issues. Prerequisite, teaching practicum.

### EDC&I

### 557 Junior High School Curriculum (3)

Historical, philosophical, and functional analysis of junior high school education, with particular emphasis on curriculum and teaching procedures.

#### EDC&I

### 558 Secondary School Curriculum (3) Johnson

Systematic description and analysis of the current curriculum practices, with particular emphasis on the factors and forces affecting secondary school curriculum.

### EDC&I

559 Principles and Procedures of Curriculum Development (3)

Guise, Hunkins

Intensive study of the basic principles and procedures utilized in the development of curricula. Prerequisite, teaching practicum.

### EDC&I

### 560 Seminar in Reading (3) Baxley, 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

### 561 Seminar in Language Arts (3) Kittell

Study of recent research in language structure with special attention to research pertaining to the teaching of language skills: auding, speech, and written composition. Course work includes group and individual analysis of language arts studies with attention to research design and measurement. Prerequisite, permission.

### EDC&I

### 562 Seminar in Reading and Language Arts: Secondary Emphasis (3)

Fea, Sebesta

Study of recent research in listening, oral language, reading, and written language, emphasizing psychological and interrelated aspects. Prerequisite, permission.

## EDUCATION

### EDC&I

### 563 Current Issues in Language Arts Education (1, max. 6)

### Kittell

Discussion of problems and issues of current interest and importance in language arts education.

### EDC&I

### 564 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 or young adults.

### EDC&I

### 565 Seminar in Social Studies Education: Elementary Emphasis (3) Jarolimek, Kaltsounis

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) Guise, Jarolimek

Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite, 465 or equivalent.

### EDC&I

567 Current Issues in Social Studies Education (1, max. 6) Kaltsounis

Discussion of problems and issues of current interest and importance in social studies education.

### EDC&I

570 Seminar in Science Education: Elementary Emphasis (3) Obstad

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, computerassisted 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

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, Kittell

Exploration of the philosophy, history, purposes, curriculum, methods, school organization, and evaluation in elementary education, with emphasis on individual research. Prerequisites, elementary school teaching experience, 556, and EDPSY 401.

#### 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)

Guise, 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: Theory and Practice (3)

Hunkins

Further investigation of the area of curriculum theory and practice. Theoretical models considered and developed in 593 are further refined and new models are discussed. Curricular practice and innovation is considered from additional theoretical frameworks. Prerequisites, 559, 593, and teaching experience.

### EDC&I

### 595 Seminar in Analysis of Teaching (3)

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, teaching experience and 401.

### EDC&I

### 596 Seminar in Strategies of Instruction (3) Kaltsounis

Exploration of the various media and types of organization relevant to the implementation of stragegies based on theoretical models. Prerequisite, 595.

### 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

#### Constitutional Freedom and American 444 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 stu-dents; and racial integration and equal financing of public schools. Open to law students and to nonlaw students enrolled as graduate students or as upper-division undergraduates. Offered jointly with the School of Law as Law 444. Satisfactory/not satisfactory option available to nonlaw students only. (Formerly 412.)

### EDEPS

# 458 History of American Education to 1865

Burgess

Development of American education in cultural context: colonial period, influence of Enlightenment, and common school movement. Offered jointly with the Department of History as HSTAA 458.

### EDEPS

### 459 History of American Education Since 1865 (5)

Burgess

Development of American education in cultural context: progressive education, recent criticism, continuing issues and trends. Offered jointly with the Department of History as HSTAA 459.

### EDEPS

#### **Crucial Issues in Education (3)** 479 Kerr

Designed to consider in some detail certain of the most significant and critical problems of educational policy.

### EDEPS

### 488 Philosophy of Education (3) Kerr, Tostberg

Consideration of philosophic questions of import to education. Emphasis on gaining ac-quaintance with the literature of philosophy of education. Attention to the forms of analysis and justification as conceptual tools for clarifying decisions of educational policy and practice. Prerequisite, EDUC 402 or 403 or 404 or equivalent, or permission of Chairman of the area of educational policy studies.

### EDEPS

#### 492 History of European Education Through the Reformation (3)

Development of European education in cultural context: Greece, Rome, Middle Ages, Renaissance, and Reformation.

### EDEPS

### 493 History of European Education Since the Reformation (3) Madsen

Development of European education in cul-

tural 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. Staff

Systematic consideration of the structure and function of educational policies and problems of research and evaluation of those policies. Includes survey of resources for description of particular types of policies.

### EDEPS

502 Sociology of Education (3) Jarolimek

Examination of roles played by small and large groups as they affect the school as a social system. Current sociological theory is modified or extended to explain school events and interrelationships. Special assignments. (Formerly 410.)

### EDEPS

### 503 History of Educational Thought (3) Burgess, Madsen

Study of educational theory and practice in Western culture. (Formerly 480.)

### EDEPS

#### 504 Philosophy of Education (3) Kerr, Tostberg

Philosophy of education considered as a study of the conceptual basis for educational policy and practice. Emphasis on relationships between enduring educational problems and fundamental philosophic issues; concepts that feature centrally in educational discourse; and conceptual analysis as a means for clarifying decisions regarding educational policy and practice. (Formerly 488.)

### **EDEPS**

### 510 Seminar in Educational Sociology (3)

Application of sociological principles to school problems; individual problems and investigations. For teachers, administrators, and those using educational sociology as a field for advanced degrees.

### **EDEPS**

### 571, 572, 573 Public and Educational Policy **Issues in the Development of Human** Talent (3,3,3)

Trends, projections, policy issues, problems, and goals in the relation between education and utilization of professional and specialized personnel. Offered jointly with the School of Public Affairs as Public Policy 571, 572, 573. Prerequisite, permission. (Formerly EDUC 571, 572, 573.)

### EDEPS

### 580 Seminar: 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, 488 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)

### Tostberg

Intensive study of the writings of selected contemporary philosophers of education. Prerequisite, graduate standing.

### EDEPS

#### Analysis of Educational Concepts (3) 588 Tostberg

Study of the application of linguistic analysis to the discourse of education. Prerequisites, 587 and permission.

### **EDEPS**

### 589 Special Topics in History, Philosophy,

and Sociology of Education (3, max. 18) For advanced degree candidates majoring in history, philosophy, and sociology of education. Prerequisite, permission.

#### EDEPS

### 594 History of the University Since the Reformation (3)

Madsen

Growth of the modern university with attention to intellectual trends as well as organiza-

## EDUCATION

tional 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 instrutor, 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.

### **HIGHER EDUCATION**

### EDHED

### 401 Student Protest Movements (3) Williams

An intensive effort to understand the role college and university students have played during recent decades in educational and social reform. Lunch counter sit-ins and other civil rights activities in the South; the protests at Berkeley, Columbia, and San Francisco State; student protest abroad—these and later activities provide the background for class discussion.

### EDHED

### 430 Higher Education and the Ethnic Minority (3) A

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. 6) Merson

Individual and group study of significant topics relating to the planning, development, organization, operation, or evaluation of current or emerging programs or problems in the community college. Prerequisite, permission.

### EDHED

499 Undergraduate Research (2-5, max. 15) For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Higher Education, endorsed by the faculty 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

**500** Field Study (3 or 6, max. 6) Individual study of an education problem in the field under the direction of a faculty member. Prerequisites, approved plan of study and permission of the instructor must be filed in the Office of Higher Education in the College of Education.

### EDHED

### 501 Occupational Programs in Higher Education (3)

Schill

Analysis of occupational preparation programs in institutions of higher education, industry, business, and governmental agencies, with emphasis on methods of determining content, on processes for evaluation, and on research.

### EDHED

502 College Instruction (3)

Reitan Analysis of various instructional modes, media, and instruments, with emphasis on current re-

search findings and methodology.

503 The Community College (3) Larsen

Study of the history and development, the roles, the objective, and the organization of the community college and of the problems and the issues confronting the two-year college.

### EDHED

### 505 The American College and University (3) Cope, Williams

Introduction to contemporary United States higher education, with special emphasis on emerging trends, roles of the 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) Larsen

For students preparing for administrative positions in community colleges. Principles and practices in organization and administration of community colleges. Prerequisite, 503 or equivalent.

### EDHED

### 521 Seminar in Occupational Programs in Higher Education (3) Schill

Analysis of current critical social and educational issues that affect occupational preparation programs in post-high-school institutions. Prerequisite, 501 or permission.

### EDHED

### 522 Seminar in Teaching and Learning in Higher Education (3-9) Reitan

Advanced seminar devoted to a consideration of theory and practice in the area of instruction and learning. May be repeated with permission. Open to advanced doctoral students in higher education and to others at the discretion of the instructor.

### EDHED

### 523 Seminar in Institutional Analysis and Planning (3)

Cope

Study of the nature, the functions, and the techniques of analysis as they pertain to institutions of higher education. The application of computer-based information systems, program budgeting, behavioral research techniques, and long-range planning procedures are examined as aids to assessment, planning, and change. Intended for doctoral candidates.

### EDHED

### 524 Seminar in the History and Organization of Higher Education (3) *Williams*

Advanced seminar on special problems in the history and the organization of higher education. May be repeated for credit at the discretion of the student and the instructor. Open to advanced doctoral students in higher education and to others at the discretion of the instructor.

### EDHED

### 525 Administering the Urban Community College (3)

Kelly

Examination of the community college in the context of the urban setting. Attention is given to the impact of ecology, critical events, and social action groups upon structure, operations, and development of the community college.

### EDHED

### 540 Internship in Higher Education (3-10, max. 10) Reitan

Field study and experience in college teaching and administration, planned by the College of Education in 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

### 551 College Problems (3)

Williams

Identification of a number of contemporary problems of American higher education, and an analysis of the methods by which solutions may be sought. Prerequisite, 550.

### EDHED

### 554 Seminar in the Administration of Colleges and Universities (3)

Concess and Universit

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) A 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

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 Higher Education in the College of Education. Prerequisite, permission.

### EDHED

### 600 Independent Study or Research (\*)

Registration must be accompanied by a study prospectus endorsed by the appropriate faculty 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.

### EDUCATIONAL PSYCHOLOGY

### 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)** Brown, Peckham, Sax

Fundamentals of measurement, construction of achievement tests, selection and administration of standardized tests and scales, and evaluation and application of test results. Prerequisites, admission to a teacher education program and permission.

### EDPSY

### 400 Developmental Foundations of Early Learning (3)

Evans, Gray, McCartin

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. (Formerly 365.)

### EDPSY

### 402 Childhood Socialization and School Practice (3)

Evans, Gray, 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 childrearing practices. The role of the school in socialization is examined with particular emphasis on socialization problems and the teacher as socialization agent. Prerequisite, 304 or equivalent.

### EDPSY

403 Adolescence and Youth (3)

Evans, Gray, McCartin Overview of the adolescent period for individuals who plan to work with students in the junior and senior high schools and in the early college years. Focus is on crucial developmental processes and patterns and considers the impact of culture upon the adolescent group. Prerequisite, 304 or equivalent. (Formerly 513.)

### EDPSY

407 Teaching the Gifted Child (3) 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, Lawrence, Salyer

Principles of mental health; normal personality development and functioning; relation of school environment to mental health of students, teachers, and administrators. Background in educational psychology is recommended, but is not a prerequisite.

### EDPSY

### 421 Remedial Education (3)

Experience in, and study of, analysis of difficulties in school subjects with special reference to language arts and mathematics. Experience in language arts and mathematics. Experience in, and study of, appropriate remedial instruction. Analysis and instruction is that considered both feasible and practical for the teacher working with individuals or with a group.

### EDPSY

# 425 Reading Disability; Remedial Techniques (3)

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) Island, McBeath

Study of guidance programs in elementary and secondary schools. Attention is given the roles of specialists with emphasis on the role of the classroom teacher in school guidance programs. This course is designed for teachers, administrators, and prospective teachers. Prospective counseling specialists should see 551, 552, 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) Klockars, Peckham, Sax

Frequency distributions, measures of central tendency and variability, linear correlation, probability, random sampling, tests, normal distributions, significance of means and corre-

lations, zero order regression and prediction.

### EDPSY

### 499 Undergraduate Research (\*)

For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Educational Psychology, endorsed by the faculty 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

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

Study of the psychological implications of verbal behavior as applied to classroom instruction and learning. Prerequisite, permission.

### EDPSY

### 506 Instructional Theory (3)

Examination of the contribution of psychology to teaching and an evaluation of selected elements in instructional strategies. Prerequisite, 505. Offered alternate years; check current Time Schedule.

### EDPSY

#### 507 **Reading Disability: Etiology and** Diagnosis-Practicum (5) Thalberg

Theory and basic concepts underlying appraisal techniques and causality. Lectures and clinical practicum in administering, scoring, and evalu-ating 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. Prerequisite. advanced graduate standing.

### EDPSY

### 510 Seminar in Educational Psychology (1-3, max. 15)

Seminar on advanced topics in educational psychology. A critical appraisal of current re-search. Prerequisites, advanced degree candidacy in educational psychology and permission.

### EDPSY

### 511 Seminar in Applied Educational

Psychology (1, max. 6)

Bashey, Forster, Island Designed for graduate students in educational psychology during, but not restricted to, their last year of residency. Selected contemporary topics relating to the application of theoretical constructs to school psychology and counseling. Prerequisite, permission.

### EDPSY

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### 514 Seminar in Quantitative Methods (3, max. 15)

Klockars

Seminar on such topics as measurement techniques, research design, psychometrics, and statistics. Prerequisite, permission.

### EDPSY

### 515. Seminar in Development and Socialization (3, max. 15)

Evans, Gray, Klockars Seminar on such topics as cognitive development, language formation, and socialization. Prerequisite, permission.

### EDPSY

### 516 Seminar in Learning and Thinking (3, max. 15)

Klockars

Seminar on such topics as learning theory, cognition, and problem solving. Prerequisite, permission.

### EDPSY

#### Advanced Educational Psychology-520 Learning (3)

Evans, Fea, Gray, McCartin Consideration of the major topics in the psy-chology of learning as applied to the teacherlearner environment. Prerequisite, 304 or equivalent. (Formerly 401.)

### EDPSY

### 521 Educational Issues in Human Learning (3)

Freehill. Gray

Study of contemporary problems in learning with emphasis on historical antecedents to modern view, methodological problems in the solution of the issues, relevant studies and phenomenological observation, implications and application of conclusions. Prerequisite, at least 20 quarter credits of previous work in educational psychology and/or psychology. (Formerly 505.)

### EDPSY

### 522 Reading Disability Clinic (3-5)

Supervised practicum in diagnosing and teaching children with reading disabilities. Prerequisites, 425, 507, and permission.

### EDPSY

540 Individual Testing (5)

Bashey, Brown, Gray, Meacham, Olch Study of intelligence testing with supervised experience. The emphasis is on the Stanford Binet and the Wechsler Intelligence Scale for Children. Prerequisites, 308, 541, and permission.

### EDPSY

541 Group Tests in Counseling (5) Bashey, Forster, Lawrence

Emphasis on the utilization of objective measures in counseling. Prerequisite, 490 or equivalent.

### EDPSY

### 542 Career Development (3)

Salver

Emphasis on vocational development theory and research. Psychological, social, and economic determinants of vocational development and choice are examined as a basis for vocational counseling. Prerequisite, graduate standing or permission.

### EDPSY

#### 543 Seminar in Vocational Psychology (3) Island

Self-directed, shared learning experiences for persons in preparation for eventual work in certain helping professions, such as teaching, counseling, nursing, agency work. The scope of inquiry includes how people spend time, particularly in work and leisure time, and how the professional helping role is related to helping persons confront the problems associated with work. Prerequisite, permission.

### EDPSY

#### 544 Counseling (5)

Brammer, Island, Lee Emphasis on the theory and practice of student counseling.

#### EDPSY

545 Practicum in Counseling (3-6, max. 6) Bashey, Brammer, Brown, Forster,

Island, Thalberg

Supervised practice in counseling. Prerequi-sites, 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

#### Organization and Administration of 547 **Student Personnel Programs (3)**

Basic considerations in planning, organizing, and operating school student personnel programs; analysis of issues and problems encountered in formulating policy; supervising and evaluating services. Prerequisites, 551, 552, or equivalent.

### EDPSY

### 548 Educational Implications of Personality Theory (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.

### EDPSY

### 561 Group Process Laboratory (3)

Brammer, Brown, Fenner, Forster, Island 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

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) Freehill, Meacham, Olch

Study of personality evaluation with a supervised laboratory emphasizing work with chil-dren and their families. Prerequisites, 540, 548, and permission.

### EDPSY

### 566 Case Study Seminar (1, max. 2) Brown, Freehill, Island

Study and experience in the case method, integrating the work of specialties with emphasis on school and child problems. To be taken with 546. Prerequisite, permission.

### EDPSY

### 570 Seminar in School and Community Psychology I (1, max. 3)

Freehill, Meacham

Seminar in current issues in professional psychology. Limited to master's degree students in school psychological services. Prerequisite, permission.

### EDPSY

### 590 Computer Utilization in Education (3) W Peckham

Introduction to programming languages, computer utilization in the solution of research problems, data reduction to forms amenable to computer processing, appropriate framing of problems for solution by computers, utilization of program packages. Prerequisite, 490. (Formerly 491.)

### EDPSY

### 591 Methods of Educational Research (3) Clark, Sax, Peckham

Introduction to educational research. Primary focus on hypothesis development, experimental design, use of controls, data analysis and interpretation. Prerequisites, 308, 490, and permission.

### EDPSY

### 592 Advanced Educational Measurements (3) Klockars, Sax

Theory of tests and measurement; an examination of assumptions involved in classical test theory, errors of measurement, factors affecting reliability and validity, and problems of weighting. Prerequisites, 308, 490.

### EDPSY

#### Experimental Design and Analysis (5) 593 Klockars, Peckham

Experimental design with specific emphasis on the analysis of variance and covariance. Prerequisites, 490 or equivalent, and 591.

### EDPSY

### 594 Advanced Correlational Techniques (5) Klockars

Multivariate analysis, including regression and multiple correlation; partial, phi, tetrachoric, biserial, and point-biserial correlation; the discriminant function; factor analysis; intraclass correlation; trend analysis. Prerequisites, 490 or equivalent, and 591.

### EDPSY

595 **Measurement and Evaluation Practices** in Early Childhood Development and Education (3) SpS

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 mea-surement 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.

### SPECIAL EDUCATION

### EDSPE

402 Instructional Modifications for the Education of the Mildly Handicapped (3) Neel

In-depth analysis and application of several modifications of instructional techniques necessary for the education of the mildly handicapped.

### EDSPE

403 Education of the Emotionally Disturbed (3)

Neel

Classroom instruction and measurement of emotionally disturbed children; modification of classroom behavior.

### EDSPE

404 **Exceptional Children (3)** 

Edgar, Lowenbraun, Smith Atypical children studied from the point of

view of the classroom teacher.

### EDPSE

### 405 Educating the Mentally Retarded (3) Affleck

Basic course for students preparing to teach the educable mentally retarded; organization of programs, curriculum planning, and instructional procedures and materials.

### EDPSE

#### 406 **Fundamentals of Reading for** Handicapped Children (3)

Preservice course. Emphasis on basic prereading and reading skills, such as phonics and structural analysis, specifically for the handicapped child. Acquisition of comprehension skills by the handicapped also presented. Diag-nosis of reading problems; published materials appropriate for handicapped; material modification.

### EDSPE

### 407 Education of Severely Retarded

Individuals With Multiple Handicaps (3) Basic course for students preparing to teach the moderately to severely retarded individual and the multiple-handicapped individual. Includes curriculum planning, instructional tech-niques, and modification of materials for these students.

### EDSPE

### 409 Mental Retardation (3) Smith

Introductory course on mental retardation and the problems it presents to parents, the mentally retarded, the community, the schools, and society.

### EDSPE

### 411 Learning Disabilities (3) Ryckman

Analysis of major theoretical approaches to the study of children with learning disabilities.

### EDSPE

### 412 Behavioral Measurement and Management in the Classroom (3)

Haring, Lovitt Response measurement in the classroom; use of

data analysis for instructional decisions and behavior management; instructional programming for handicapped children.

### EDSPE

### 414 Integrating Handicapped With

Non-Handicapped Preschool Children in the Inner City (3)

Edgar, Hayden

Upper-division course designed for teachers and aides planning to work in inner-city preschool classrooms where handicapped children are integrated with nonhandicapped children.

### EDSPE

### 416 Evaluation of Instructional Materials for **Exceptional Children (3)**

Ryckman Introduction to techniques of determining the quality of instructional materials in terms of (1) the systems of specific subject matter organization and (2) specified instructional outcomes.

### EDSPE

### 418 Vocational Development of Handicapped Children and Youth (3)

Auld

Curricular aspects of vocational training relevant to each age level in the education of handicapped children. Application of programmed instructional techniques to breaking down of the occupational task. Emphasis on familiarizing school personnel with interdisciplinary services and community resources available to assist them in facilitating the maximal vocational development of handicapped children and youth.

### EDSPE

### 419 Interventions for Families of Handicapped Children (3) WS

Edgar, Hayden

Upper-division course for professionals and paraprofessionals working with families of handicapped children enrolled in special education or integrated programs.

# 433 History, Education, and Guidance of the Deaf (3)

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)

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

### 496 Workshop in Special Education (1-6, 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

### 504 Seminar in Educating the Socially and Emotionally Disturbed (3) Haring, 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, prepares a model application proposal for basic or applied research and prepares a scholarly manuscript for dissemination.

### 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

### 508 Administration of Special Education (3) Haring, Hayden

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. Prerequisites, background in special education and public school administration.

### EDSPE

509 Seminar in Mental Retardation (3) Smith

Interdisciplinary approach to the advanced study of selected research topics in mental retardation. Designed for teachers, psychologists, social workers, and related professional personnel.

### 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

### 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

### 515 Problems and Issues in Special Education (3, max. 9)

Affleck, Hayden, Lowenbraun Intensive examination of the issues pertinent to all of special education, such as legislation, interdisciplinary function, and the role of special education in general education and placement practices. Prerequisite, permission.

### EDSPE

### 516 Developing Instructional Materials for Exceptional Children (3)

Ryckman

Theory and basic concepts underlying the writing of instructional materials for exceptional children. The course involves a basic review of the literature in programming research and methodology. Students write, field test, and rewrite a unit of instructional materials for a specific population of exceptional children. Prerequisite, 416.

### EDSPE

### 517 Practicum in Research Design and Analysis in Special Education (3) Ryckman

Critical analysis of current research practices in special education serves as background to a student carrying out a small independent research project. Projects are evaluated in seminar discussion. Prerequisites, EDPSY 490 and 591 or equivalent, or permission.

### EDSPE

### 518 Seminar in Special Education Research (1, max. 3)

Lovitt, Lowenbraun, Ryckman, Smith Designed for doctoral students in special education during their year of residency. Each candidate selects a dissertation problem and submits a proposal. Topics such as the procurement of subjects, the reporting and communication of research findings, and the evaluation of research are stressed. The seminar leads to the evolution of a viable dissertation proposal.

### EDSPE

### 520 Seminar in Special Education

(1-3, max. 6) A Designed for graduate students in special education. Focus on contemporary topics relating to the application of the theoretical constructs to special education. Prerequisite, permission.

### EDSPE

### 521 The Communicative Disorders of the Exceptional Child (3) Scroggs

Discussion centers on the theory and models of communication. Neurophysiological bases of communication are then explored with reference to different types of exceptional children. Offered to advanced undergraduates and graduates with permission of instructor; an introductory course in psychology and special education is desirable.

### EDSPE

### 530 The Teaching of Speech to the Deaf (6) Lowenbraun

Study of principles and techniques used in developing English sound by the analytical method; introduction of speech by the whole-word method; major emphasis on development of speech in the preschool and school-age deaf child; an introduction to manual communication.

### EDSPE

### 531 The Teaching of Language to the Deaf (6) 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

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

### 534 The Psycho-Educational Principles of Lipreading (3)

Scroggs

Theoretical, practical, human, and intellectual elements of the lipreading process. Historical perspectives, current methods of instruction, and research are presented and evaluated.

### EDSPE

### 565 Seminar: Early Childhood Education for the Handicapped (3) W

Advanced seminar on early childhood educacation 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 ac-cording 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 credit hours per credit in a specific school situation, level as requested. Scheduled seminars required. Prerequisite, application during quarter prior to participation, and permission.

### EDUC

#### Practicum in Community Service 401 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

### Practicum in Classroom Teaching and 402 Management: Early Childhood, Kindergarten, Primary (Through Grade 3) (5-36) Dimmitt

Teaching practicum is completed in an assigned public school. A full day, from 8 a.m. to 4 p.m., must be left free for this assignment. Placement is made by the director of field experiences. Prerequisites, application during Spring Quarter prior to expected participation; completion of the required professional education sequence and of required portion of the elementary education minor; 2.00 grade-point average in professional education; 120 minimum credits; and permission. (20 credits required for certification.)

### EDUC

#### **Practicum in Classroom Teaching and** 403 Management: Intermediate Grades, Middle School (5-36) Dimmitt

Teaching practicum is completed in an assigned public school. A full day, from 8 a.m. to 4 p.m., must be left free for this assignment. Placement

is made by the director of field experiences. Prerequisites. application during Spring Quarter prior to expected participation; completion of the required professional education sequence and of required portion of the elemenin professional education; 120 minimum cred-its; 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 public school. A full day, from 8 a.m. to 4 p.m., must be left free for this assignment. Placement is made by the director of field experiences. Prerequisites, application during Spring Quarter prior to expected participation; completion of the required professional education sequence; 2.00 grade-point average in professional education: 120 minimum credits: and permission. (20 credits required for certification.)

### **EDUC**

#### **Advanced Practicum in Community** 501 Service Activity (3-18) Dimmitt

Opportunity is provided postbaccalaureate stu-dents 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, grad-uate 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

#### **Advanced Practicum in Classroom** 502 **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 premaster graduate students (i.e., those who have not yet completed the master's degree requirements in their major field at the University of Washington). Name of faculty member responsible for supervising the student should be indicated on the Program of Studies. Prerequisite, permission of supervisory committee chairman or Graduate Program Adviser.

### EDUC

### 800 Doctoral Dissertation (\*)

Research for the doctoral dissertation and research preparatory or related thereto. Limited to intermediate-level (i.e., those who have com-

pleted the master's degree or the equivalent) or Candidate-level graduate students. Premaster students initiating doctoral dissertation re-search 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 relation-ships; reading and interpreting drawings; design drawing; selected topics in applied descriptive geometry and graphical statics; practical applications in graphical calculus, empirical equations, and nomography. Start-ing unit determined by test. Subject matter covered determined by student's interests and major. (Formerly 120, 121, 123.)

### ENGR

#### 130 **Techniques of Communication (3) AWSp** 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

Seabloom

Solution of problems in engineering measurements, statistics, probability, and unit sys-tems. Design of experiments. Collection of data in several laboratories in the college. Corequisite, Mathematics 124.

### ENGR

### Computer Applications to Engineering Problems I (4) AWSpS 141 Dunn

Language of FORTRAN applied to engineering problems. Flow charts, problem organization, and basic computer statements. Introductory problems solved on CDC 6400. Prerequisite, Mathematics 124, which may be taken concurrently, or permission.

### ENGR

150 Design and Synthesis (3) WSp Chalk

Introduction to the engineering design process.

### ENGINEERING

Individual and team effort is directed from conceptual and formative stages through preliminary design. The design may involve a concept, a technique, a device, a facility, or a process to meet the needs of a particular problem.

### **ENGINEERING SCIENCES**

### ENGR

### 170 Fundamentals of Materials Science (4) AWSpS Polonis

Elementary principles underlying the structure and properties of materials utilized in the practice of engineering. The properties of in-organic and organic materials are related to organic 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, Chemistry 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 ma-terials; optical microscopy, X-ray diffraction, mechanical properties, electrical conductivity, crystal growth, solid-state reactions. Prerequi-site, 170 or concurrent registration.

### ENGR

### 180 Engineering Statics (4) AWSpS Morrison

Principles of statics, basic concepts, parallelogram law, Newton's law, resultants, force-couple relationships, equilibrium diagrams, equilibrium analysis, three-dimensional structures, two-dimensional frames, trusses, friction, and virtual work. Vector algebra used throughout the course. Prerequisite, Mathematics 125, which may be taken concurrently.

### ENGR

### 190 Introduction to Logical System Design (3) WSp

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 meth-ods along with formal algorithms for com-binational logical simplification. Examination of time dimension in logical models for development of sequences of operations or de-cisions. 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 Fyfe

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 par-ticles, rigid-body mechanics. Prerequisite, Mathematics 126.

### ENGR

#### Introduction to Continuum Mechanics 240 (4) AWSpS ווּוֹת

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. Mathematics 126 and Physics 121.

### ENGR

### 250 Introduction to Engineering System Dynamics (4) AWSp Jorgensen

Lectures and laboratory demonstrations introducing the concept of system analysis and mathematical modeling by ideal-lumped linear elements and their interconnections. Identifi-cation of system variables and application of basic physical laws. Discussion of approx-imations required to describe the response of engineering system elements by linear differential equations with constant coefficients. Computational methods for finding the system response, on both analog and digital computers. Comparison between the system response and that of the computational mode. Prerequisite, Mathematics 126.

### ENGR

### 260 Thermodynamics (4) AWSpS Oates

Introduction to the basic principles of ther-modynamics, from a predominantly macro-scopic point of view. Development of the basic laws of thermodynamics, together with this illustration by application to energy transformations and state changes in engineering problems. Prerequisites, Mathematics 126, 100-level physics and chemistry courses.

### **ELECTIVES**

ENGR

### 110 Career Planning I (1) AW Whittemore

Meets weekly in both large sections and small sections. The large sections are primarily devoted to an introduction to the College of Engineering, curricular options, fields of engineering, interdisciplinary programs, and information of general interest. The small sections provide an opportunity for students to become acquainted with an engineering faculty member and a time to ask questions and to obtain assistance in preparing a statement of career and educational goals. Offered on credit/no credit basis only.

### ENGR

161 Plane Surveying (3) ASp

Macartney 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

### Air-Water Interface Transportation Vehicles (3) WSp 270 Bollard

The force system acting on air-water inter-face 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 engi-neering 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 applica-tions and methods of detection.

### ENGR

#### The Energy Question (3) ASp 307 Albrecht, Garlid

Description and analysis of crucial questions, nontechnical 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

308 The Energy Question Laboratory (1) ASp Laboratory devoted to computer modeling and analysis of energy problems to accompany. 307.

### ENGR

### Computer Applications to Engineering Problems II (3) AWSpS 341 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 dif-ferential equations. Prerequisites, 141 or equivalent and Mathematics 238, which may be taken concurrently. (Formerly 390.)

### 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. (Formerly 215.)

### ENGR

### 346 Assembly Language Programming (3) AWSpS Redeker

The central processor assembler language,

COMPASS, of the CDC 6400 computer, including program structure and organiza-tion, COMPASS language instructions, pseudoinstruction, and macroprogramming techniques. Integer and floating-point conversion, character manipulation, simple and nested loops, array accessing, COMPASS-FORTRAN subroutine linkage, and instruction timing. Pro-grams are coded and executed on the computer. Prerequisite, 141 or equivalent. (Formerly 315.)

### ENGR

### 351 Inventions and Patents (1) Sp Seed

Law and procedures for patenting inventions, employer-employee relationship and trade-marks. Primarily for engineering students. Prerequisite, junior standing.

#### ENGR

### 360 Introductory Acoustics (3) Sp

Chalupnik, Fyfe, Rogers, Sigelmann Historical development of acoustics; the terminology and units employed. Sound sources in engineering systems. The wave equation, traveling and standing waves. The analysis of vibrating systems. Helmholtz resonators, wave transmission, and reflection. Ultrasonics and instrumentation. For advanced sophomores and juniors. Prerequisite, 12 credits of engineering sciences or permission.

### ENGR

498 Special Topics in Engineering (1-3, max. 6) AWSpS

#### ENGR

Special Projects in Engineering (1-3, 499 max. 6) AWSpS

### **AERONAUTICS AND** ASTRONAUTICS

### **Courses for Undergraduates**

# A A 300, 301, 302 Aerodynamics I, II, III (3,3,3) A,W,Sp

Decher, Ganzer, Joppa, Rae The atmosphere and the fluid medium. Dimensional analysis and force coefficients. Kinematics and dynamics of flow fields; incompressible flow about bodies. Thin airfoil theory; finite wing theory. Compressible fluids; one-dimensional compressible flow; two-dimensional supersonic flow. Viscous flows; boundary layers. Prerequisite, 301 for 302; En-

### 310 Orbital Mechanics (3) A Kevorkian, Ness, Vagners

gineering 260 recommended.

Dynamics of systems of particles. Gravitational field of the earth. Keplerian motion. Orbital transfer. Satellite motion with perturbations. Prerequisite, junior standing.

### AA

#### 311 Flight Mechanics (3) W

Ganzer, Joppa, Ness

Dynamics of systems of particles-rigid body motion: applications to constrained rigid bodies and flight mechanics. Prerequisite, 300 or 310 or Engineering 230,

# 312

Aeroelasticity (3) Sp Bollard, Ness

Vibration theory. Approximate methods for

determining principal frequencies and modes. Application to the study of aeroelastic insta-bilities, divergence, control reversal, flutter.

### 320, 321, 322 Junior Laboratory I, II, III (2,2,2) A,W,Sp Ahlstrom

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 threequarter sequence.

### AA

### 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; Engineering 240 recommended.

# A A 370

Introduction to Applied Analysis ()3) Sp Pearson, Street

Advanced calculus, from applications point of view. Matrix methods. Dimensional analysis and theory of modeling. Review of vectors; surface and volume integral identities. Fourier series. Prerequisite, Mathematics 238.

### ΑA

### 400, 401, 402 Gas Dynamics I, II, III (3,3,3) A.W.Sp

Ahlstrom, Christiansen, Rae, Russell Review of thermodynamics. Introduction to kinetic theory and statistical mechanics. Onedimensional 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.

# 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, struc-tural design of components. Prerequisites, 302 for 410; 332 and 411 for 412.

### A A

#### **Environmental Aspects of Energy** 424 Conversion and Heat Engines (3) W Decher, Hertzberg

Considerations of ecological constraints on the design of heat engines. Thermal pollution of air and water, and pollution by electrical power plants. Advanced methods of power production and of waste heat elimination. Chemistry and kinetics of high-temperature gases. Chemical emission by automotive engines, gas turbines, and hybrid engines. Prerequisites, Chemistry 140, Engineering 260, or permission.

### AA

### 430 Matrix Structural Analysis (3) A Dill, Holsapple

Introduction to matrix methods of structural analysis. Prerequisite, 331.

A A

### 431 Plates and Shells (3) W

Dill, Holsapple, Parmerter Introduction to the theory of plates and shells. Prerequisite, 332.

### 432 Special Topics in Structural Analysis (3) Sp

Bollard, Dill, Holsapple, Parmerter Problems and introduction to theory associated with plastic behavior, viscoelastic materials, filament wound and laminated structures, fatigue, creep, and impact. Prerequisite, 331.

## A A 440, 441, 442 Flight Mechanics I, II, III (3,3,3) A,W,Šp

### Ganzer, Joppa

Calculation of aerodynamic coefficients and stability derivatives. Prediction of performance, stability, and control characterisitcs 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 parame-ters; comparison of wind tunnel and derived aerodynamic characteristics. Determination in flight of performance, stability, and control characteristics; and comparison with predicted and wind tunnel results. Prerequisites, 302 for 440; 441 for 442.

# A A 450, 451, 452 Space Mechanics I, II, III (3,3,3) A,W,Sp

Kevorkian, 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 threeparticle problem. Rigid-body motion of space vehicles. Elements of orbit determination. Mathematics 238 recommended.

### 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, turbofans, tur-boprops, ramjets, hybrid engines. Aerody-namics of gas-turbine engine components. Piston engine-propeller performance. Prerequisites, 302 and Engineering 260.

#### 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, Mathematics 238.

### ENGINEERING

#### 480 Systems Dynamics (3) W 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.

### AA

#### 481 **Elementary Aeroelasticity (3) Sp** Bollard

Discussion of aeroelastic problems in aircraft design; elementary development of static and dynamic aeroelastic problems. Prerequisites, 312, 480.

# A A 482

### Aeronautical Acoustics (3) A 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**

### 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. Equilibrium flow of real gases. Vibrational and chemical rate processes. Problems in molecular laser physics and nonequilibrium flow. Nonequilibrium kinetic theory. Radiation transfer in gases and radiation gas dynamics.

### A' A

### 504, 505, 506 Fluid Mechanics I, II, III (3,3,3) A.W.Sp

Ahlstrom, Christiansen, Decher, Russell, Street

Review of thermodynamics; vectors and dyads. Derivation of the Navier-Stokes equations, stream functions and potential functions, integrals of the equations of motion. Boundary conditions and discontinuity surfaces in fluids. Dimensional analysis, sound waves, surface waves. Ideal incompressible flows, compressible flows. Laminar and turbulent viscous flows, transonic flow, hypersonic flow, combustion, super fluids. Prerequisite, 567, which may be taken concurrently with 504.

### AA

# 507, 508, 509 Aerodynamics of Viscous Fluids I, II, III (3,3,3) A,W,Sp Russell, Street

Introduction to viscous flow; exact solutions of the equations of motion; approximate equations; exact solutions of steady two-dimensional laminar boundary layers; approximate methods for two-dimensional steady laminar boundary layers, the phenomena of turbulence; free turbulent flows; turbulent boundary layers. Special topics.

#### 510 **Wave Propagation in Fluids and Solids** (3) Sp

Fyfe Examination of the fundamental concepts of wave propagation; group, phase, and shock velocities; interaction of different wave forms; theory and application of the method of characteristics to wave propagation problems.

### 511 Unsteady Aerodynamics (3) W

Oscillating airfoils at subsonic and supersonic speeds; consideration of wings and bodies in unsteady flow. Offered only when warranted by sufficient enrollment.

#### AA 512

### Magneto-Fluid Dynamics (3) Sp Ahlstrom Review of electrodynamics and Maxwell's

equations; orbit theory of charged particles, statistical mechanics of ionized gases; continuum magneto-fluid dynamics, -the two-fluid model and the one-fluid model; wave propagation in a plasma. Offered only when warranted by sufficient enrollment. Prerequisite, 504.

#### 513 Gas Laser Theory and Practice (3) Sp Christiansen, Hertzberg, Russell

Study of the physics and fluid mechanics of high-power lasers with emphasis directed to the performance of modern gas dynamic lasers, flowing chemical lasers, and gaseous electric lasers. Techniques of obtaining population inversions, power extraction, basic 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.

### 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.

#### 519 Special Topics in Stability and Control (3, max. 6) 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 Seminar in Aerodynamics (1-3, max. 12) AWSp

Study of recent advances in aerodynamics. Topics vary from year to year. Open only to students having the M.S. degree or its equivalent.

### 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 aero-dynamics-secondary flows, boundary layers and separation, turbulence in supersonic inlets, engine compatibility, engine noise. (Offered even-numbered years.)

### 527, 528 Energy Conversion I, II (3,3) W,Sp Decher, Oates

Analysis of cycles for space and low-pollution commerical 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.

## A A 535, 536, 537 Analysis of Shells I, II, III (3,3,3) Sp,A,W

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.

### 540, 541, 542 Finite Element Analysis I, II, III (3,3,3) W.Sp,A

Dill, Holsapple

The finite element concept; historical background; relation to classical theory; finite element models; general finite element theory. Finite elements in structural mechanics; structural idealization; constraints; linear and nonlinear problems. Finite element theory for inelastic bodies; problems in structural dynamics and wave propagation; finite element applications to other fields.

### 545, 546 Bioastronautics I, II (3,3) W,Sp Bollard

Systematic study in how the principles of engineering science apply to specific biosystems; to acquaint the student with the principles of structure and function of the human organism. Prerequisite, 545 for 546.

# A A 547

### **Engineering Aspects of the Fluid** Mechanics of the Human Body (3) Sp Oates

Engineering background to the many flow regimes existing in the human body. Specific examples of flow problems such as cardio-vascular, bronchial, microcapillary, urethral, etc. Prerequisite, permission.

### 550, 551 Aerospace Systems I, II (3,3) W,Sp Bollard, Fyfe, Ganzer

Study of aerospace system analysis employing transform methods. The effect of subsystem behavior such as the flexibility of flight vehicle structure, aerodynamic forces.

# 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, max. 6) AWSp

#### 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 557 **Nonlinear Problems in Aerospace** Systems (3) A

Application to aeronautics of nonlinear ordinary differential equations and the topology of their integral curves in the phase plane; dynamical interpretation of singular points; existence of periodic solutions, questions of stability; nonlinear resonance; frequency demultiplica-tion; relaxation oscillations.

#### 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 program-ming, singular arcs, distributed parameter systems. Elements of differential games. Emphasis on problem formulation and motivation of mathematical ideas rather than rigorous mathematical development.

### AA

#### 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. Prerequisites, Mathematics 407, linear algebra and advanced calculus, or permission.

### 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. Prerequisite, 569. (Offered oddnumbered 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. Algebraic numerical methods.

568 Analysis in Engineering II (3) W Survey of properties and practical techniques for ordinary differential equations. Series expansions. Eigenvalue problems. Laplace transforms. 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. Singu-larities, Green's functions. Classification of second-order equations; theory and applications of method of characteristics. Numerical techniques. Offered jointly with the Department of Mathematics as Mathematics 569. Prerequisite, 568 or Mathematics 428.

## A A 571, 572, 573 Principles of Dynamics I, II, III (3,3,3) A,W,Sp

Fyfe, Kevorkian, Vagners .

Review of rigid body dynamics; calculus of var-iations. Lagrangian mechanics. The canonical equations of Hamilton; canonical transformations. Hamilton-Jacobi theorem; Hamiltonian perturbation theory. Periodic and quasi-peri-odic motion. Stability of dynamical systems; resonance in dynamical systems. Motion near a given motion. Applications to particle and rigid body space mechanics, nonlinear oscillations. (571 offered every Autumn Quarter; 572, 573 offered even-numbered years.)

#### 575 Thermo- and Electrodynamics of Continua (3) W

Dill, Holsapple

Application of the principles of the phenomenological theory of irreversible thermodynamics and of the electrodynamics of continuous media to fluids and solids. Prerequisite, 567.

### AA

### 576, 577, 578 Perturbation Theory I, II, III (3,3,3) A,W,Sp Kevorkian

Basic concepts of asymptotic expansions: evaluation of integrals. Singular perturbations: limit process expansions, matching, uniformly valid approximations. Method of multiple scales; nonlinear oscillations, resonance phenomena. Applications in fluid, solid, and particle mechanics. (Offered even-numbered years.)

### 580, 581, 582 General Theory of Continuous Media I, II, III (3,3,3) A,W,Sp Dill, Holsapple

General formulation of the classical field theories: fundamental concepts of motion, stress, energy, entropy, and electromagnetism for a continuum; conservation of mass; balance of momentum; balance of energy, including ther-modynamics of irreversible deformations; balance of electromagnetism. General nature of constitutive equations for a continuum. Examples of kinematic, energetic, mechanical, thermomechanical, electromagnetic, and electromechanical constitutive equations. Prerequisites, 567 and intermediate standing.

## A A 583 Special Topics in Solid Mechanics (3) AWSp

### Dill, Holsapple

Study of recent advances in the mechanics of

solids. May be repeated for credit by permission.

# 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 equa-tions. Variational methods. Eigenvalue problems. Nonlinearities. Applications to practical problems in fluid flow, stress analysis, acous-tics, electromagnetism. Prerequisites, 567, 568, 569. (Offered odd-numbered years.) (Formerly 565, 566.)

# A A 587, 588, 589 Techniques of Applied Analysis I, II, III (3,3,3) A,W,Sp

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. Prerequisites, 567, 568, 569 or equivalent. (Offered even-numbered years.)

# A A 590

### **Special Topics in Applied Analysis** (3, max. 9) AWSp

Pearson

Research-level seminar; topic varies from year to year.

A A 599 Special Projects (2-5, max. 15) AWSp Investigation on a special project by the student under the supervision of a faculty member.

600 Independent Study or Research (\*) AWSp

700 Master's Thesis (\*) AWSp

#### 800 Doctoral Dissertation (\*)

### 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.

## ENGINEERING

### **CHE**

**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.

# contact operations and multiphase extraction, and introductory thermochemistry.

### CHE

### 326 Chemical Engineering Thermodynamics (4) W

Phase equilibria and chemical equilibria in multicomponent systems; theories of solution; chemical reaction analysis. Prerequisite, Engineering 260 or Chemistry 456, which may be taken concurrently.

### CH E

### 330 Transport Processes I (4) W

Diffusive transport of momentum, heat andmass; 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. (Formerly 487.)

### 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.

### CHE

### 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 the Department of Electrical Engineering as Electrical Engineering 461. Prerequisite, senior standing in engineering or permission.

### CH E

### 465 Reactor Design (3) W

Application of principles of chemical kinetics to the design of commercial-scale chemical reactors; characterization of batch and flow reactors, in homogeneous and heterogeneous systems. Prerequisite, 435.

### CHE

### 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, Chemistry 102 or 232, or permission.

### **CHE**

**471** Pulp and Paper Technology (3) W Morphology of wood fibers, manufacture of mechanical and chemical pulps, stock preparation, paper machine operation, coated papers, paper-plastic combinations, converting operations. Prerequisite, Chemistry 102 or 232, or permission.

### CH E

**472** Pulp and Paper Laboratory (2) Sp Laboratory experiments in the pulping of wood, fiber technology, and the physical and chemical characterization of paper and pulp. Prerequisite, 471.

### CH E

### **480** Process Dynamics and Control (3) A Analysis of the dynamics of simple chemical process units and systems; applications to stability, control, and instrumentation of such processes. Prerequisite, senior standing.

### **CHE**

### 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.

### CHE

### 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 instrumients, components of, or entire, artificial organs (heart, kidney, lung) and artificial structural elements (bone, teeth, skin), all for use in contact with body fluids. Offered jointly with the Center for Bioengineering as Bioengineering 490. Prerequisite, permission.

### CHE

### 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.

### CHE

### 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 UI (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 the Department of Mechanical Engineering as Mechanical Engineering 543, 544. Prerequisite, 6 credits in graduate fluid mechanics. (Offered Autumn Quarter in odd-numbered years.)

### CH E

### 555 Interfacial Phenomena (4) Sp Berg

Surface tension, capillary statics, wetting and spreading phenomena; thermodynamics of capillary systems, adsorption, surfactant monolayers and micellar solutions; capillary hydrodynamics, interfacial turbulence and applications in distillation, absorption, and extraction. Prerequisites, 525, 530, or permission.

### CH E

### 556 Principles and Applications of Colloidal Materials (4) Sp Hoffman

Preparation, stabilization, properties and destruction of important colloidal materials. The theory and structure of the electrical double layer, 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

• Larson

Modern experimental and theoretical techniques for the study of the rates and the mechanisms of chemical reactions. Investigation of systems of homogeneous gas phase reactions from molecular and phenomenological viewpoints. The mathematical characterization of reacting systems. Relationships between the stationary state and the exact solutions to rate equations. Chain reactions. Kinetic isotope effects. Absolute-rate theory. Classical and quantum statistical description of spontaneous decomposition. Photochemical, thermal, and chemical activation techniques. Intramolecular and intermolecular energy transfer. Theoretical descriptions of unimolecular and bimolecular reactions. Characterization of solution and surface reactions. 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.

### **CHE**

### 571 Cellulose and Lignin (3) W Sarkanen

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 Hrutfiord

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 the College of Forest Resources as Forest Resources 578. Available to seniors. Prerequisites, 470, 471, or permission. (Offered alternate years; offered 1975-76.)

### CH E

### 580 Topics in Chemical Engineering Design (3) 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. Prerequisite, undergraduate chemical engineering design or permission.

### CHE

### 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.

#### CHE

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) ASpS Colcord, Veress

Introduction to geodetic and photogrammetric concepts and their applications to engineering surveys. Errors. Measurement of position with modern techniques including use of tacheometric, optical, and electronic instruments. Reduction to plane coordinates. Analysis and adjustment of measurements. Prerequisites, Engineering 141 or permission and 18 credits in mathematics.

### CIVE

### 320 Transportation Engineering I (4) WS Hoag, McNeese

The design of alignment and grade of the traveled way, as well as its physical components; roadbed, drainage, pavement, and other design elements. Relationship of design elements to vehicle and human characteristics. Prerequisite, 316.

### CIVE

### 342 Fluid Méchanics I (4) AWSpS Nece

Elementary mechanics of incompressible fluids, hydrostatics. Continuity, energy, and momentum equations. Introduction to potential flow. Resistance phenomena for laminar and turbulent flows. Dynamic similitude. Prerequisites, Engineering 230 and Mathematics 224.

#### CIVE

### 345 Hydraulic Engineering (4) AWSp Richey

Extension and application of fluid mechanics principles to hydraulic engineering problems. Diffusion and mixing processes, surface-water and groundwater hydrology, open channel flow, pipeline systems, turbomachinery. Prerequisite, 342.

### CIVE

### 350 Environmental Engineering (4) WSp 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, asphalt, soils, and bituminous mixtures. Laboratory testing, instrumentation, and investigation into microbehavior. Correlation with microstructure and various aspects of materials science. Prerequisites, 393, which is to be taken concurrently, Engineering 170, 240, or permission.

### CIVE

### 366 Soils Engineering (4) ASp Meese, 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

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### **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

### ENGINEERING

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 justification, 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) A,W,Sp Wenk

Analysis of the interaction of technology and society through general principles and case studies of contemporary issues and public policy: the nature of the technological enterprise, its scientific base, ingredients of capital, specialized manpower, organizational structure and management; employment of public and private institutions; policy planning to generate, utilize, and manage technology so as to maximize opportunities and minimize unwanted consequences; institutional conflicts; development of goals, strategies, program priorities, and policies; legal and economic considerations; processes of public decision making. The first quarter is devoted to general principles, sociopolitical processes and cognitive mapping, using the concept of technological delivery systems; the second, to postfacto case studies such as in environmental policy, urban transportation, health care delivery, weather modification, civilian nuclear power, and federal organization for science; the third, to a class-generated group research on a contemporary technology issue in Washington State leading to specific policy proposals. Prerequisite, permission.

### CIVE

### 543 Marine Technology Affairs I (3) W 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

424 Pavement Design (3) W

Current rational pavement design procedures. Viscoelastic behavior of flexible pavements. Layered systems. Elastic slab theory, considering such factors as temperature and warping stresses. Other elements of pavement design. Prerequisite, senior standing in civil engineering.

### CESM

### 463 Structure of Materials (3) W Miller

Exploration and development of those aspects of material science applicable to civil engineering. The nature of metals, ceramics, polymers, and composites in terms of thermal, chemical, physical, and mechanical properties. Metallurgy of fracture. Laboratory optical techniques. Prerequisite, CIVE 363.

### CESM

### 467 Soil Mechanics II (3) A

Meese 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. 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, Mattock

Theory of models, dimensional analysis, direct model analysis; studies employing specific materials, techniques of testing and measurement. Offered jointly with the Department of Architecture as Architecture 521. Prerequisite, permission.

### CESM

### 481 Bridge Design (3) Sp Hawkins

Design of highway bridges. Design considerations; planning; characteristics of different types, economy, esthetics, loading, vibration, deflection, distribution of loads to slabs and girders. Design of typical slab and beam bridge in accordance with AASHO specifications. Prerequisites, senior standing and CIVE 381.

### CESM

### 482 Advanced Reinforced and Prestressed Concrete (3) W

Birkeland, Hawkins

Analysis, design, and construction of reinforced and prestressed concrete structures. Prerequisite, CIVE 381.

### CESM

### 483 Design of Steel Structures (3) AWSp Vasarhelyi

Design of steel structures, structural steels, manufactured products, and fabrication methods. The design of members and structural systems for various load conditions accepted in practice. Prerequisite, CIVE 381.

### CESM

### 484 Design of Reinforced Concrete Structures (3) AWSp

### Hawkins, Mattock, Mittet

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, Mattock

Structural behavior and design of reinforced brick, tile, and unit concrete masonry structures. Offered jointly with the Department of Architecture as Architecture 426. Prerequisite, CIVE 381 or permission.

### CESM

### 494 Introduction to the Mechanics of Continuous Media (3) A

Evans, Hartz

Rigorous development of the basic equations of motion of elastic solids and Newtonian fluids through the use of vectors and Cartesian tensors, mechanical behavior of materials, problems in linear elasticity and fluid statics and dynamics. Prerequisites, Engineering 230, 240, CIVE 342 or Aeronautics and Astronautics 300, or permission.

### CESM

### 498 Special Topics: Structures and Mechanics (1-5, max. 12) AWSpS

Special topics in civil engineering offered as course with lecture and/or laboratory. May be repeated for credit. Prerequisite, permission of department Chairman. A maximum of 6 credits may be applied toward an undergraduate degree.

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### CESM

### 499 Special Projects: Structures and Mechanics (1-5, max. 12) AWSpS

Individual undergraduate research projects. May be repeated for credit. Prerequisite, permission of department Chairman. A maximum of 6 credits may be applied toward an undergraduate degree.

### **Courses for Graduates Only**

### CESM

520 Seminar (1, max. 6) AWSp Prerequisite, permission of thesis supervisor.

### CESM

### 566 Engineering Properties of Clay (3) A Sherif

Shearing strength, consolidation characteristics, structural concepts, rheological behavior, and related properties of clay. Prerequisite, CIVE 366. (Formerly CETC 566.)

### CESM

### 567 Stresses in Earth Masses (3) W Sherif

Stress function. Stress-strain analysis within elastic range with emphasis on soil/water systems. Stress distribution under various loadings. Prerequisites, 467 and Mathematics 324, or permission. (Formerly CETC 567.)

### CESM

### 568 Seepage and Slope Stability (2) W Meese

Analysis of groundwater flow, using relaxation, matrix and finite-element methods. slope stability analysis, considering seepage forces and pore-water pressures. Prerequisites, 467, 566. (Formerly CETC 568.)

### CESM

### 569 Applied Soil Mechanics (3) Sp Meese

Passive pressure and bearing capacity theories. Foundation soils engineering project to develop design recommendations and performance estimates for deep and shallow foundation schemes. Prerequisite, CIVE 366. (Formerly CETC 569.)

### CESM

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# 571 Advanced Mechanics of Materials II (3)

Theory of stretching and bending of plates. Introduction to membrance 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

Elias, Evans, Hartz Matrix methods in structural mechanics. Review of basic structural theory. Principle of virtual work. Development of basic matrix force (flexibility) and displacement (stiffness) methods of structural analysis. Prerequisite, graduate standing or permission.

### CESM

### 574 Structural Mechanics II (3) W

Elias, Evans, Hartz

Dynamic response of structures using mode

superposition and matrix methods. Lumped and distributed parameter systems. Application to earthquake, moving and blast loads. Approximate and numerical methods. Prerequisite, 573 or permission.

### CESM

### 575 Structural Mechanics III (3) A Elias, Hartz

Variational and energy methods in structural and solid mechanics. Application of calculus of variations and minimal principles of mechanics to nonlinear structural analysis, elastic stability, theory of elasticity, plates and shells, and vibrations. Prerequisite, 574 or permission.

### CESM

### 576 Theory of Plates and Shells (3) W Elias

General theory of thin shells. Membrane and bending behaviors. Application to axisymmetric shells, shallow translational shells, and circular cylindrical shells. Prerequisite, 571 or permission.

### CESM

### 577 Finite Element Methods in Structural Mechanics (3) Sp

Elias, Hartz

Extension of the matrix methods of structural analysis to the solution of elasticity, plate and shell problems by use of finite element approximations. Discussion of convergence and bounding and extension to investigation of stability and finite deformations. Prerequisite, 573 or permission.

### CESM

### 580 Strain Measurements (3) W <sup>(</sup> Vasarhelvi

Experimental determination of strain under static and dynamic loads; mechanical, optical, and electrical strain gauges; transducers for displacement, velocity and acceleration; photoelasticity, strain rosette, brittle coating and other methods; problems of instrumentation, and analysis of data. Prerequisite, graduate standing or permission.

### CESM

582 Advanced Structures II (3) W 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

Plastić (inelastic) behavior of structural steels. Applications to the design of structural members and systems. Upper- and lower-bound theorems, minimum weight design. Limitations and economy of the procedure. Prerequisite, graduate standing or permission.

### CESM

### 585 Advanced Design of Concrete Structures (3) Sp

Mattock

Advanced topics in the design of reinforced and prestressed concrete structures. Design of

cast-in-place and precast statically indeterminate prestressed concrete structures. Design of prestressed concrete flat plate structures. Unusual design problems in reinforced concrete. Prerequisites, 482, 484, or similar basic courses in design of prestressed and reinforced concrete.

### CESM

### 586 Structural Materials and Design (3) W Hawkins

Critical review and discussion of the mechanical properties of structural steel, structural aluminum alloy, and reinforced concrete that affect structural design. Fatigue and impact in 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 Mattock

Behavior of structural concrete members subject to long- or short-term loading by axial force, bending, shear, and torsion. Prerequisite, 484.

### CESM

### 589 Behavior of Concrete Structures (3) W Mattock

Behavior under load of concrete structures, continuous beams, frames, and slabs. Effect of creep and shrinkage on the behavior of structures. Prerequisite, 588.

### CESM

590 Structures Under Wind (3) W 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 Elias, 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

Elias, Evans, Hartz Rigorous formulations of classical theory making use of Cartesian tensor analysis. Stress

making use of Cartesian tensor analysis. Stress functions. Use of potential theory to obtain solutions in terms of Papkovitch functions. Prerequisite, Aeronautics and Astronautics 530 or Mechanical Engineering 551, or permission.

### CESM

### 593 Theory of Elasticity III (3) W

Elias, Evans, Hartz Further topics in elasticity theory, including the Muskhelishvili method for plane elastostatics, integral transforms, contact problems, and fi-nite elastic deformations. Prerequisites, 592 and Aeronautics and Astronautics 580. (Offered even-numbered years.)

### CESM

#### 594 Wave Propagation in Solids (3) W Evans, Hartz

Dynamic formulation of the theory of elasticity; elastic waves in two- and three-dimensional solids; elastic waves in rods, beams, and plates; plastic and viscoelastic wave propagation in sol-ids. Prerequisites, 574 or equivalent and 592, or permission. (Offered odd-numbered years.)

### CESM

#### 599 **Special Topics: Structures and**

Mechanics (2-5, max. 15) AWSpS Prerequisites, permission of instructor and department chairman.

### CESM

Independent Study or Research: 600 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 constructional materials and subgrade soils. Design of roadway elements. Not to be taken for credit by civil engineering majors. Prerequisites, Engineering 161 and Mathematics 125.

### CETC

### 401 Highway and Traffic Engineering Functions (3) AS Sawhill

Historical development of highway transportation in the United States and significant legislation in its development, including federal, state, and local programs. An overall view of traffic engineering in relation to planning, design, operations, administration, safety, and research. For students in traffic safety education. Not approved for students with credit for 410. Prerequisite, graduate or senior standing.

### CETC

### 405 Critical Path Methods of Project Scheduling (2 or 3) AWSp Dunn, Hoag

2 credits-precedence analysis of project activities; critical path methods (CPM); computer applications. 3 credits-CPM project; PERT and PRECEDENCE techniques. Prerequisite, Mathematics 105.

### CETC

#### **Construction Engineering (3) W** 406 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** Secrest

Specification writing and the elements of contract law relating to heavy construction and engineering services. Prerequisite, junior standing.

### CETC

410 Traffic Engineering—Fundamentals (3) A General review of scope and functions of traffic engineering including its relation to urban planning, municipal engineering, motor vehicle registration, safety, and administration. Prerequisite, senior or graduate standing in engineering, or permission.

### CETC

### 413 Highway Capacity and Traffic Flow Theory (3) W

Sawhill

Modern practices in the estimation of street and highway capacity; mathematical models; application of queuing theory to traffic events. Prerequisite, senior or graduate standing in engineering.

### CETC

### 415 Photogrammetry (3) AS

Colcord, Veress Geometrical characteristics of photographs. Planning and control considerations for mapping in terrestrial, aerial, and underwater environments. Theory of stereoscopy and parallax measurement. Photogrammetric instrumentation. Evaluation of accuracies and error sources. Prerequisite, CIVE 316 or permission.

### CETC

#### Cadastral Surveys (3) WS 417 Colcord

Boundaries; the system of public lands; adverse and riparian rights; subdivision design and site planning. Professional ethics.

### CETC

### 418 Engineering Control Surveys (3) Sp Colcord, Veress

Theory and application of conformal projections (Lambert, UTM). Electronic distance measurements, precise traverse planning and analysis. Trilateration control for engineering projects and photogrammetry. Azimuth checks. Prerequisite, CIVE 316.

### CETC

#### 421 **Transportation Engineering II (4) S** Sawhill, Staff

Physical elements of transportation facilities: roadbed, drainage, pavement, railways, runways, waterways, and other design components of transportation systems. Prerequisite, junior or senior standing in civil engineering.

### CETC

# 425 Introduction to Urban Transportation (3)

Horwood

Identification of the framework, central concepts, constraints, and issues of the urban transportation planning problem. Offered jointly, with the Department of Urban Planning as Urban Planning 430.

### CETC

#### **Special Topics: Transportation,** 498 **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. Prerequisite, permission of department Chairman. A maximum of 6 credits may be applied toward an undergraduate degree.

### CETC

Special Projects: Transportation, 499

**Construction, and Geometronics** (1-5, max. 12) AWSpS

Individual undergraduate research projects. May be repeated for credit. Prerequisite, permission of department Chairman. A maximum of 6 credits may be applied toward an undergraduate degree.

### **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 re-view of research and identification of future research needs. Prerequisite, senior or graduate standing.

### CETC

### 510 Traffic Engineering-Analysis (3) A Sawhill

Measurement and evaluation of characteristics of vehicular volume, speed, travel time, delays, and travel desires. Parking studies and computer analysis of traffic engineering studies. Prerequisite, CETC 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 engineer ing 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

#### Stereo-Photogrammetry (3) W 515

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. Perspectivity. Colinearity, 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. 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 Transportation Systems (3) A

Interregional highways, state trunk lines and local roads; their functions and appropriate standards of design. The characteristics of road, rail, water, and air transport in relation to selection and design of the facility. Pipeline and conveyor transportation. Prerequisite, graduate standing in engineering or permission.

### CETC

523 Transportation Terminals (3) W

Coordination of transportation facilities. Port and harbor installations. Airports. Rail belt lines and terminals. Prerequisite, graduate standing in engineering or permission.

### CETC

### 524 Rapid Transit (3) Sp

Engineering problems in the mass movement of people in metropolitan areas. Demand in relation to level of service. Equipment. Route selection. Running time. Station spacing. Prerequisite, graduate standing in engineering or permission.

### CETC

### 525 Transportation and Land Use Planning Models (3) A

Schneider

Theory underlying land use and transportation planning models. Reviews of past efforts to model urban development. Modeling of alternatives. Forecasting technological innovation, assessing environmental impacts. Offered jointly with the Department of Urban Planning as Urban Planning 530. Prerequisite, permission.

### CETC

### 526 Transportation Studies, Model Calibration, and Network Flow (3) Sp Nihan

Review of the organization of regional transportation studies, including the functions of engineers, planners, and others. Examination of transportation and land-use models as applied to transportation studies and analysis of current models. Application of technology of traffic assignment to transportation networks, with problems of tree building, network flow, restrictions and system optimization by computer. Prerequisite, graduate standing or permission.

### CETC

### 527 Information Systems for Planning and Research (3) A Bell, Dunn

Computer programming technology and data systems designed for large-scale data inputs. Machine editing, data manipulation, and retrieval. Laboratory problems adapted to specialized interests of students. No previous computer programming experience required. Offered jointly with the Department of Geography as Geography 527 and the Department of Urban Planning as Urban Planning 527.

### CETC

### 528 Automated Mapping and Graphing (3) W Dunn, Youngmann

Computer applications to statistical and areal analysis. Laboratory problems adapted to specialized interests of students. Offered jointly with the Department of Geography as Geography 528 and the Department of Urban Planning as Urban Planning 528. Prerequisites, 527, basic statistics, or permission.

### CETC

#### Computer Applications to Urban and 529 Regional Analysis (3) Sp Calkins, Horwood

Simulation models and automated systems for the study of land use and related economic and demographic data. Machine methods of planning analysis and feedback review. Laboratory projects. Offered jointly with the Department of Geography as Geography 529 and the Depart-ment of Urban Planning. as Urban Planning 529. Prerequisite, 528 or permission.

### 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; de-termination of time azimuth; latitude and longitude for Laplace stations; computations of geodetic position; introduction to satellite methods. Prerequisite, permission.

### CETC

### Airport Systems Planning (3) W Shinn 535

Investigation of environmental, sociopolitical, and economic features of air transportation system planning. Emerging technologies. Intermodal relationships. The decision-making process for resource allocation, land-use planning, programming, and organization. Scenarios of anticipated conflict and resolution problems. Offered jointly with the Department of Urban Planning as Urban Planning 534. Prerequisites, 425, Urban Planning 400, or permission.

### CETC

Electronic Surveying (4) W 537 Veress

Modern EDM instrumentation theory and ap-

plications; 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 imagery, and other sensors for object evaluation and environment studies. Factors in system and target signature evaluation. Prerequisite, permission.

### CETC

#### 599 **Special Topics: Transportation, Construction, and Geometronics** (2-5, max. 15) AWSpS

Prerequisites, permission of instructor and de-partment Chairman.

### 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 the College of Fisheries as Fisheries 434.

### **CEWA**

### 435 Physiological Effects of Water Pollutants (3) Sp

### Brown, Welch

Physiological effects of water pollutants on economically important or endangered fishes, especially with respect to waste Types of industrial, urban, and water. agricultural entities that contribute wastes to natural waters. Monitoring procedures and assessment of changes in fisheries as a consequence of waste effluents. Offered jointly with the College of Fisheries as Fisheries 435. Prerequisites, upper-division or graduate standing, organic chemistry, and some background in any of the following: general physiology, cell biology, biochemistry, chemical biology, sanitary engineering.

### CEWA

### 441 Intermediate Fluid Mechanics (3) A 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, res ervoirs, 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 transfor-mations due to boundary conditions, sediment motion, elementary tidal theory; applications illustrated by laboratory experiments and selected case histories. 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.

### CÈWA

#### **Analysis Techniques for Groundwater** 446 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; introduc-tion 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 environ-ment is to be maintained. The quantity and quality of present production of wastes; their environmental effects; practical known methods of control; prospects for the future. The essential team approach to these engineering problems is stressed, noting the inter-relationship of physical, chemical, and biolog-ical 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)

### Bogan

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 planning activities. Engineering methods and computer programs for designing basic system elements. Prerequisite, CIVE 350.

### CEWA

### 452 System Engineering Fundamentals (3) ASp

Mar

Development of scientific methods for the tasks of problem definition, goal setting, system synthesis, system analysis, and decision making necessary in the application of the system approach to complex environmental problems. These methods consider social, political, and institutional factors as part of the system.

## CEWA 453 Water and Waste-Water Treatment (3) W Bogan

Objectives of water and waste-water treatment; associated physical, chemical, and biological phenomena; design of common treatment systems. Prerequisite, 451 or permission.

### CEWA'

### 454 Sanitary Engineering Design Studies (3) Sp

Bogan

Individual and group design studies involving local communities. Application of the principles and methods presented in 451. Preparation of comprehensive plans and of preliminary design and cost studies for urban water supply, sewerage and drainage, and solid-waste collection systems. Presentation of engineering reports dealing with selected design problems. Prerequisite, 451, which may be taken concurrently.

### CEWA

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, Chemistry 160 or equivalent.

### CEWA

#### Air Resources Engineering I (3) ASp 461 Rossano

Fundamental aspects of air pollution. Analysis of interrelationship between the essential factors of emission sources, meteorology, and to-

pography and adverse effects on sensitive receptors. Review of the principles of air-pollution control, with emphasis on engineering ap-proaches. 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 nonengineering students. Prerequisite, sophomore standing.

### CEWA

#### Air Pollution Source Testing and 467 **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 emis-sions 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. Laboratory com-posting studies.

### CEWA

### 485 Sampling Techniques for Water Quality (3) Sp Welch

Collection and analysis of water for selected abiotic and biotic characteristics in lakes, rivers, and estuaries. Emphasis is placed on the natural variability of water quality charac-teristics 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

### Special Topics—Water and Air Resources (1-5, max. 12) AWSpS 498

Special topics in civil engineering offered as course with lecture and/or laboratory. May be repeated for credit. Prerequisite, permission of department Chairman. A maximum of 6 credits may be applied toward an undergraduate degree.

### CEWA

#### Special Projects-Water and Air 499 Resources (1-5, max. 12) AWSpS

Individual undergraduate research projects. May be repeated for credit. Prerequisite, permission of department Chairman. A maximum



of 6 credits may be applied toward an undergraduate degree.

### **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

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 the Department of Atmospheric Sciences as Atmospheric Sciences 525. Prerequisites, 461 and Atmospheric Sciences 301 or Geophysics 403.

### **CEWA**

Acoustics of Environmental Noise (4) A 528 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 the Department of Mechanical Engineering as Mechanical Engineering 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. Prerequisite, CIVE 342 or permission.

### CEWA

542 Hydrodynamics I (3) W Nece

Fundamentals of fluid potential motion. Twoand 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. 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**

#### **Biological Waste Treatment (3) W** 550 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)

### 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

#### **Design of Water and Waste Treatment** 552 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 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. Prerequisite, 557, 558, or permission.

### CEWA

### 560 ' Topics in Environmental Health (3) W Rossano

Introduction to human biology, including physiology, epidemiology, ecology, and toxicology. Study of modern environmental health problems and practices regarding radiological health, solid-waste disposal, food- and vector-borne diseases, occupational health, fluoridation, biometeorology, and bioengineering.

### CEWA

### 562 Air Resources Engineering II (3) W 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. Administrative and legal aspects of air conservation; air quality criteria and standards; design of area-wide surveys; long-range planning. Prerequisite, 461 or permission.

### **CEWA**

### 564 Aerosol Science and Technology I (3) W Charlson

Topics related to suspended particulate matter in a gaseous medium. Statistics, mechanics, and physical chemistry of aerosols. Particular reference to particulate matter in air and to experimental and engineering methods. Prerequisite, permission.

### CEWA

#### Aerosol Science and Technology II (3) Sp 565 Charlson

Continuation of 564; light scattering, Brownian motion, diffusion and coagulation of aerosols. Prerequisite, permission.

### CEWA

**Design of Gaseous Air Pollutant Control** 566 Equipment (3 or 5) A

Pilat

### Principles and design of the physical and chem-

### ENGINEERING

ical processes employed in the removal of gaseous pollutants. Design of adsorption towers (packed and spray), absorption beds, and flame incinerators for controlling the emissions of gaseous air pollutants. Case studies of design, construction, performance, and cost of actual gaseous air pollutant control systems. Students not majoring in air resources engineering may register for 3 credits by permission.

### CEWA

#### 567 Design of Particulate Air Pollutant Control Equipment (3 or 5) W Pilat

Principles and designs of processes used to control the emission of particulate air pollutants. Design of settling chambers, cyclones, filters, wet scrubbers, and electrostatic precipitates. Design, construction, performance, and cost of actual particulate air pollution control installation. Students not majoring in air resources engineering may register for 3 credits by per-mission. Prerequisites, 564 and 566, or permission.

### CEWA

### 571 Solid Waste Management (3) W Hammar, Mar

Graduate workshop for engineers, applied scientists, planners, administrators, economists, and public health students to examine current solid-waste planning, management, and oper-ating 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. recovery, recycling, incineration, and pyrolysis. The role of new technology, social incentives, and community action in alleviating solid-waste problems is developed. For students majoring in solid-waste management and for urban planners and business administration majors. Prerequisite, 470.

### **CEWA**

#### 599 **Special Topics: Water and Air Resources** (2-5, max. 15) AWSpS

Prerequisites, permission of instructor and department Chairman.

#### CEWA

600 Independent Study or Research-Water and Air Resources (\*) AWSpS

### **ELECTRICAL ENGINEERING**

### **Courses for Undergraduates**

### EE

#### 201 Introduction to Electrical Engineering (3) AWSp

Introduction to the fundamentals of electrical engineering. Topics covered include fundamentals of communication, power, electronics, and the techniques of engineering analysis and design in these areas. This course is intended as an introductory course only and cannot be used as an electrical engineering elective. Prerequisite, Mathematics 125, which may be taken concurrently.

### EE

#### 299 **Special Topics in Electrical Engineering** (1-5) AWSp

New and experimental approaches to basic electrical engineering. May include design and construction projects. Prerequisite, permission of department Chairman.

### R R

### 306 Elements of Electrical Engineering (5)

Principles of operation and application of the more frequently used electrical and electronic instruments. Theory and practical circuit application of semiconductors, diodes, transistors, and operational amplifiers. A short introduction to electrical machinery, operational including theory and operating experience. Includes a three-hour laboratory per week. Prerequisites, Physics 122 and Mathematics 126.

### ΕĒ

### 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. Prereq-uisite, 351, which may be taken concurrently, or permission.

### EE

### 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.

### EЕ

### 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, Physics 122, Mathematics 238.

### ЕE

### 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.

### EE

#### 338 Energy Transmission (4) AWSp

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.

### EE

#### Introduction to Electromechanical 343 **Energy Conversion (5) AWSp**

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.

### EE

### 351 Electronics (4) AWSpS

Semiconductor device characteristics and cir-

cuit models; integrated circuits used for basic digital and analog applications, such as counters, amplifiers, and comparators. Prerequisites, Physics 122, Mathematics 238.

### ΕE

#### 353 Analog Electronic Circuits (4) AWSpS

Application of semiconductor devices and semiconductor integrated circuits to analog electronic systems. Emphasis on frequency re-sponse, amplification, feedback, and power amplification. Prerequisites, 310, 333, and 351.

### EE

### 354 Analog Electronic Circuits Laboratory

(1) AWSpS Three-hour laboratory each week. To be taken concurrently with 353.

### EE

#### 371 Fundamentals of Computer Operation (4) AWSp

Organization and operating principles of digital computers. Representation of information, processor components, machine operation, and data transfers. Relation of computer design to programming and computer applications. Prerequisite, 351.

EE

### 381 Electrophysics I (4) AWSpS

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, Physics 123, Mathematics 238.

ΕE

### 383 Electrophysics II (4) AWSpS

Propagation of electromagnetic, elastic, and particle-probability-density waves in homoge-neous and periodic regions. Elements of statistical mechanics. Electromagnetic properties of materials; polarization, charge transport, p-n junctions. Prerequisite, 381.

### ЕE

### 399 **Special Topics in Electrical Engineering**

(1-5) AWSp New and experimental approaches to current electrical engineering problems. May include design and construction projects. Prerequisite, permission of department Chairman.

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.

### ΕE

415 Computer-Aided System Analysis (3) Sp Concepts, principles, and techniques concerned with the design, testing, and application of gen-eral-purpose problem-oriented computer pro-grams for analyzing large-scale systems. Specific attention to implementation on computers. Prerequisites, Engineering 141 and senior standing.

### E 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 tech-

niques, and hypothesis testing with applications to engineering systems. Prerequisite, 333 or permission.

### EĒ

#### Introductory Communication Theory (3) 418 Sp

Techniques of digital and analog communications; modulation coding, and noise. Examples of practical communication systems and channels, channel capacity. Prerequisites, 417 and 441, or permission.

### EE

### 421 Electroacoustics (4) A

Fundamentals of acoustics and the electroacoustical aspects of electromechanical systems. Characteristics of transducers. Synthesis of systems. Includes laboratory to be arranged. Prerequisite, 383 or permission.

### EE

## 433 Electronic Circuit Design (4) ASp

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

#### Applied Electronic Design (3) AWSp 439

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 re-sults. Instruction by practicing electronics design engineers. One-hour lecture and threehour laboratory weekly. Prerequisites, 353, 354 and permission.

a

### EE

### 441 Linear Systems Analysis (3) AWSp

Analysis of linear systems using Fourier series, the Fourier integral, Laplace transforms, and the convolution integral, Laplace transforms, and the convolution integral. Fourier series ex-pansion 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 La-place transform. Response via the Laplace transform system transfer function. Frequency response. Prerequisite, 333 or permission.

### EE

### 442 Linear Analysis (3) W

Sampling theorem, linear constant coefficient difference equations, state variable formulation, linear time-invariant digital filters, Z-transform techniques, frequency response, design of low-pass and band-pass digital filters, discrete Fourier transform and fast-Fourier transform with application.

### EE

### 445 Nonlinear Systems Analysis (4) W

Dynamic analysis of nonlinear circuits and of other simple systems. Exact methods, graphical methods, approximate methods, including linearization and numerical and analog com-puter solutions. Stability. Forced vibrations. Prerequisite, 333 or permission.

### EE

## 446 Control System Analysis I (4) AWSp

Linear servomechanism theory and design principles. Pole-zero analysis, stability of feedback systems by root-locus and real-frequency response methods. Design methods of Bode and Nichols. Introduction to ad-vanced topics in automatic control theory. Prerequisite, 441 or permission.

### EE

447 Control System Analysis II (3) Sp State space formulation of multivariable feed-back 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

### 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 character-istics, loss mechanisms, thermal characteristics, and principles of rating. Steady-state and transient behavior. Includes one threehour laboratory per week. Prerequisites, 333 and 381.

### 454 Power System Analysis (4) W

Polyphase circuits in balanced and unbalanced cases. Symmetrical and related components. System impedances. Fault computations. Load computations. System stability in flow steady-state and transient cases. Introduction to economic operation of power systems. Prerequisites, 333, 381.

### EE

#### Wave Effects in Bio-Materials (3) Sp 460

Ultrasonic, 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 the Bioengineering Program as **Bioengineering** 460.

### EE

### 461 Electrochemistry (3) Sp

Fundamentals of electrochemistry with applications to batteries and industrial processes. Emphasis is on obtaining a basic working knowledge in the field. Offered jointly with the Department of Chemical Engineering as Chemical Engineering 461. Prerequisite, senior standing in engineering or permission.

### EE

### 467 Introduction to Radio Science (3) Sp

Introduction to radio astronomy, including radio telescope antennas and interferometry, radio telescope receivers, nature of radio sources. Remote sensing of the earth's surface in meteorology and ocean and land surface applications, including mapping of agricultural areas and natural resources. Sensing of the propagation medium by passive (radiometric) and active (scattering, acoustic sounding) techniques, ionosphere, and magnetosphere. Prerequisite, 383 or permission.

### EE

# 468 Applied Optics (4) W

Fundamentals of optical image formation, data

ΕE

#### 469 **Boundary Value Problems and Wave** Fundamentals (4) A

Wave propagation in varying types of material media of practical importance, including ion-ized, 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

### 472 Computer Software Systems (3) W

Principles of operating systems, compilers, assemblers, interpreters, and loaders for digital computers. Not intended for graduate students in computer science or electrical engineering with emphasis on advanced programming. Not open to students who have taken 501 or 502. Offered jointly with the Computer Science Group as Computer Science 472. Prerequisite, 478

### EE

### 473 Wave Shaping (5) AW

Generation and transmission of special waveforms, including pulses, square waves, and linear ramps; clipping, clamping, and d-c resto-ration; astable, monostable, and bistable multivibrators; applications to analog and digital systems. Includes one four-hour laboratory on alternate weeks. Prerequisites, 353 and 354.

EE

### 475 Digital Systems (4) Sp

Synthesis of digital systems from functional electronic subassemblies; integrated logic circuits; shift registers; generation and conversion of digital codes; analog to digital conversion. Includes one four-hour laboratory on alternate weeks. Prerequisites, 353, 354 and 371.

### EE

#### 476 Logical Design of Digital Devices (3) WSp

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

477 Digital Computer Applications (4) ASp 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 facil-ities of the Computer Center are utilized. Prerequisite, Engineering 390.

### EE

#### **Computer Organization and Machine** 478 Language Programming (4) ASp

Differences and similarities in computer structure. Flow of control. Instruction codes and their execution for arithmetic, logical, character manipulation, and input-output operations. Indexing and indirect addressing; subroutine linkage. Study of information representations and their relationship to processing techniques. Offered jointly with the Computer Science Group as Computer Science 478. Prerequisites, Engineering 141 and 315, or equivalent.

### EE

481 Fundamentals of Microwaves (4) Sp Microwave circuit elements, waveguides and resonators; microwave measurement techniques; high-frequency triodes, klystrons, and other transit-time devices; beam-type and solid-state amplifiers. Includes one three-hour laboratory per week. Prerequisites, 383, 353, and 354.

### EE

### 485 Semiconductor Devices (4) AW

Physics of p-n junctions and semiconductor surfaces; operating principles of various semiconductor devices. Development of small-signal and switching circuit models. Includes junction transistors, controlled rectifiers, field effect transistors, microwave and integrated circuit devices. Prerequisite, 383 or equivalent.

### ΕE

### 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.

### EE

### 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.

### ΕĒ

#### **Control System Components and** 498 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.

### EE

Special Projects (2-5, max. 10) AWSp 499 Assigned construction or design projects carried out under the supervision of the instructor. Prerequisite, permission of department Chairman.

### **Courses for Graduates Only**

### EE

#### **Compiler Construction I (3) Sp** 501 Golde

Basic concepts and design of interpreters, assemblers, and compilers. Lexical analysis, syntax analysis, storage management, and code generation for general-purpose languages. Prerequisite, Computer Science 505.

### EE

#### **Compiler Construction II (3) A** 502 Golde

Advanced topics of compiler construction. Translator writing systems, incremental compilation, compiler-interpreters. Practical considerations for production compilers. Prerequisite, 501.

### ĔΕ

#### 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.

### ЕE

505 Analysis of Random Processes (4) S Lytle, Martin

Probability theory; discrete and continuous random variables; stochastic processes. Spectral analysis of random signals and noise. Prerequisite, graduate standing.

### ΕĒ

### 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 facing channels. Waveform communication, optimum filters. Prerequisite, 505 or equivalent.

### ΕE

### Random Processes—Engineering Applications (3) W 508

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.

### ΕE

#### 509 **Engineering Applications of Linear** Graphs (3) W

Andersen

Elementary theory of linear graphs, incidence, cut-set and circuit matrices, matrix formulation of loop, node, and state equations, topological analysis and synthesis of networks, signal flow graphs, applications to switching circuits, automata and communication nets. Prerequisite, graduate standing or permission.

### ЕE

#### 510 Introductory System Theory (4) A Dambord, 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 sys-tems are stressed. Prerequisite, graduate standing or permission.

### EE

#### 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.

### EE 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 par-asitic elements and realizability conditions. Illustrative applications related to negative resistance amplifiers, feedback amplifiers, and active filters. Prerequisite, 441 or permission.

### ΕE

### 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.

### EE

### 517 Introduction to System Optimization (3) Hsu

Systems engineering and optimization; classical optimization techniques; equality constraints and inequality constraints; Kuhn-Tucker conditions; linear inequalities and linear programming; nonlinear optimization and program-ming; 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.

### ΕE

### 518 Digital Signal Processing (4) A

Fundamental principles of systems that process signals by digital means. Difference equations, Z transforms and discrete linear systems theory. Effects of computational error caused by A/D conversion, arithmetic roundoff and parameter quantization. Discrete and fast Fourier trans-form algorithms, real-time systems, and the design and the simulation of digital filters. Special-purpose software for digital signal-processing facilities. A three-hour laboratory session is held on alternate weeks. Offered jointly with the Computer Science Group as Computer Science 518. Prerequisite, graduate standing in electrical engineering or computer science or permission.

#### EЕ 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 repression for linear and nonlinear models.

### EE

### Acoustics in Engineering I (3) Sp Harris, Ishimaru, Sigelmann 525

Acoustic wave transmisson, reflection, refraction, and diffraction in solids, liquids, and gases. Includes review of continuum mechanics and examples from electromechanical systems. Offered jointly with the Department of Mechanical Engineering as Mechanical Engineering 525. Prerequisite, graduate standing

in electrical or mechanical engineering, or permission.

#### EE 526 Acoustics in Engineering II (3) A Auth, Harris, Sigelmann

Continuation of 525. Material differs each year, covering such topics as scattering, moving media, ultrasonics, acoustic holography, optoacoustics, transducer propagation in anisotropic medium, etc. Offered jointly with the Department of Mechanical Engineering as Mechanical Engineering 526. Prerequisite, 525 or permission.

### EE

### 529 Optical Electronics (4) A Auth

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.

#### EE **Electromagnetic Properties of Materials** 530 (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.

### EE

#### **Electronic Conduction in Solids (4) Sp** 531 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 semicon-ductors. Some aspects of superconductivity. Prerequisite, 530 or permission.

# E E 532

### **Engineering Quantum Electrodynamics** (4) Sp

Bjorkstam, Yee

Elecromagnetic field quantization; coherent and incoherent states of the radiation field. Fully quantum theory of the interaction be-tween electromagnetic radiation and matter. Quantum theory of the laser. Photon counting, correlation and noise. Parametric conversion; Raman and Brillouin scattering. Prerequisite, 530 or permission.

### EE

533 Advanced Semiconductor Devices (3) W 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 litera-ture. Prerequisite, 485 or permission. (Offered odd-numbered years.)

### EE

#### 535 Semiconductor Circuits (3) Sp Guilford, Lauritzen

Modeling of transistors, resistors, and other devices used in integrated circuits. Design of digital and analog integrated circuits. Design of digital and analog high-frequency transistor models and circuits. Prerequisite, 485 or permission.

# E E 538 Topics in Electronic Circuit Design (1-5) A

Guilford

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

#### Linear Control System Analysis (3) A 545 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) AŴSp Stabb

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.)

### ΕE

#### **Neural Communication and Control in** 547 **Biological Systems (3) Sp** Pinter

Conveys quantitative knowledge of the means by which electrochemical events generate, modulate, and demodulate neuronal signals and noise, and the manner in which these signals interact in the nervous system. The constraints placed on transmission of information in the nervous system are discussed, together with pertinent examples, such as the visual system. Prerequisite, advanced graduate standing or permission.

### EE

### 548 Optimal Control (3) A

Hsu

Variation calculus and optimal control, the Pontryagian 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.

### ЕE

### 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. Load shedding as a tool of system control and protection. Prerequisites, 454 and 446 or 545.

### EE

#### 560 Wave Phenomena (4) W Rogers

General study of wave phenomena in which vibrations in physical structures and in elastic media are compared with electromagnetic waves. Interaction of physical materials with electromagnetic wave. Prerequisite, 383 or permission. (Offered when adequate enrollment develops prior to close of advance registration.)

### EE

#### 563 Noise in Electron Devices (3) W Lauritzen

The physical mechanisms of noise generation in electronics; thermal noise, quantum noise, shot noise, flicker noise. Characterization of noise; noise figure, noise temperature, noise measurements. Optimum low-noise circuit design, lownoise operation of semiconductor and optical electronic devices. Prerequisites, 485, 505, or permission. (Offered even-numbered years.)

### EE

#### 570 Antenna Theory (3) A 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 sperical 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.

ЕE

### 573 **Electromagnetic Theory and**

Applications II (4) W Carlson, Harris, Ishimaru, Sigelmann Boundary value problems for scattering, dif-fraction, 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

#### 578 Radio Propagation I (3) W

Helms, Reynolds, Swarm

Theory of the propagation of radio waves in the neutral lower atmosphere, including effects of scattering, diffraction, and refraction. Tech-niques of remote sensing in the lower atmosphere using radio waves are investigated and related to geophysical problems. Prerequisite, graduate standing or permission.

### ЕE

#### 579 **Radio Propagation II (3) Sp** Helms, 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 Weiner-Hopf method to control system design; the Wiener-Kalman filter and its application in stochastic control systems. Pre-requisites, 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.

### ЕE

#### 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 multivari-able control systems; state transition matrix for continuous and discrete time systems; difference equations and Z-transform; application of state space approach to control system design. Prerequisite, graduate standing or permission.

#### EE 585 Digital and Sampled-Data Systems (3) Sp 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, dig-ital 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. Pre-requisites, FORTRAN and graduate standing.

### EE

#### **Digital Computer Applications and** 587 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 im-plementation. Threshold logic theory. Evaluation of various analysis and synthesis methods in logical systems. Prerequisite, 588.

### EE

#### **Advanced Topics in Digital Computers** 590 (2-5, max. 15) AWSp

Golde, Holden, Johnson

Lectures or discussions of topics of current'interest in the field of digital computers. Subject matter may vary from year to year. Prerequi-site, permission.

### ĒĒ

#### 591 Advanced Topics in Network Theory (2) 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.

### ĒΕ

### **Advanced Topics in Communication** 595 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** (\*) AWSp

Prerequisite, permission of department Chairman.

- 600 Independent Study or Research (\*) AWSpS
- ΕĒ
- Master's Thesis (\*) AWSpS 700

### EE

EE

800 Doctoral Dissertation (\*) AWSpS

### **HUMANISTIC-SOCIAL STUDIES**

### **Courses for Undergraduates**

HSS

300 Practice in Technical Reporting (1) ASp Souther, Trimble, White

Application of the fundamentals of technical reporting to the specific reporting activity of students who are enrolled in a laboratory, project, or other designated course in the College of Engineering.

### HSS

### 304 Introduction to Scientific and Technical **Communication for Foreign Students (4)**

Selinker, Trimble Scientific and technical writing and reading for foreign students well grounded in oral English. Concentration on (1) application of rhetorical concepts most frequently used in scientific and technical writing, (2) grammatical analysis in areas traditionally difficult for foreign students, and (3) grammatical-rhetorical analysis of scientific and technical discourse. Offered jointly with the Department of English as English 304.

### HSS

#### 305 Scientific and Technical Report Writing for Foreign Students (4) Selinker, Trimble

Application of the problem-solving approach to scientific and technical writing. Concentration on (1) undergraduate laboratory reports, (2) advanced grammatical analysis in areas traditionally difficult for foreign students, and (3) advanced grammatical-rhetorical analysis of scientific and technical discourse. Offered jointly with the Department of English as English 305. Prerequisite, 304 or English 304 or permission.

HSS

### 310 Self, Symbol, and Society (3) Skeels

Anthropological concepts of social institutions and psychological concepts of the self are used for the interpretation of myth and literature from one or more historical cultures, and for the comparison of these with the individual, his symbolic creations, and his situation in today's world.



#### **Development of Western Cultural** 320 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

#### The Human Image in Medieval and 351 Renaissance Literature (3) Elliott, White

Selected literary figures and works of Western

### ENGINEERING

# M

civilization in the Middle Ages and the Renaissance.

### HSS

### 401 Scientific and Technical Writing (4) A Souther

Principles and practice of writing to communicate scientific and technical information in government and industry. Writing assignments include such types of communication in the field as reports, proposals, specifications, manuals, and procedures, as well as special projects of the student's choice.

### HSS

### 402 Scientific and Technical Editing (4) W White

Editorial responsibilities and practice in the communication of scientific and technical information; the editor's role, both as editor and as supervisor of publication groups. Prerequisite, 401 or permission.

### HSS

### 407 Thesis Guidance for Foreign Students (1, max. 3)

Trimble

Individual tutorial assistance in writing problems for the foreign student preparing to write or writing a thesis in one of the engineering disciplines. Offered on credit/no credit basis only. Prerequisite, permission.

### HSS

### 410 Contemporary Political and Social **Problems (3)** *Botting, Higbee*

Twentieth-century background and development of contemporary political and social problems; comparison of competing political philosophies and systems: democracy, fascism, communism; current international and national events and issues.

### HSS

### 419 Technology's Impact on the Modern West (5)

Botting Examines significant innovations of technology from the Industrial Revolution to the mid-twentieth century and explores the social consequences of these innovations, as well as

the social reactions to them.

### HSS

### 420 Technology in Contemporary Western Culture (5) Botting

Examines the nature of technology, its relationship to culture and to the physical environment; treats with the problems and issues created by the impact of technology on society, including the relationship between technology and social change, effects of technology on economic and political organizations, and the relationship among technology, human values, and the individual; examines implications of future technological development for man and his culture.

### HSS

### 421 Socioeconomic Consequences of Technology (3) Douthwaite

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 decisionmaking 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

### 431 Human Rights and the Governmental Process (3)

Higbee Analysis of governmental actions (particularly antidiscrimination legislation) designed to reduce discrimination on account of race, color, religious creed, national origin, and, more recently, age and sex in various sectors of American life. The attendant issues, problems, and administrative solutions to leading cases are examined. Prerequisite, upper-division

# standing.

### 435 Impact of Technology on Human Rights (4) AWSp Higbee

The impact of technology on human rights, ranging from its safeguarding of these rights to its incursions on them and associated constitutional processes. Particular attention is given to secret surveillance technology, indiscriminate data storage and retrieval, and other technologies ranging through those of the mass media to bioengineering. The institutionalized and impersonal aspects of technology are examined, and possible remedies are explored. Upper-division standing recom-

# mended.

### 450 The Human Image in Twentleth-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 the Department of Mining, Metallurgical, and Ceramic Engineering as Ceramic Engineering 442.

### HSS

### 471 Introduction to the Folktale Among Literate Peoples (3) Skeels

Techniques of classification, geographichistorical distribution, theories of origin and interpretation, and related areas of investigation of the oral prose folk narrative of literate peoples. Offered jointly with the Department of English as English 415.

### HSS

### 472 Introduction to American Folklore (5) 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 of how to collect it. Offered jointly with the Department of English as English 416.

### HSS

### 480 Science Fiction and Fantasy: Prophecy and Symbol (3)

Leahy, Skeels, White

Science fiction is compared with forecasts of the future by authorities in science and technology. Categories of prophecy and degrees of departure from the probable to the fantastic are determined. The fiction is analyzed in terms of depth of meaning and of the particular stylistic qualities and abilities of the authors.

### HSS

### 498 Special Projects (1-5, max. 5)

Work on a special project by a student under the supervision of an instructor. Prerequisites, upper-division standing and permission of the instructor and the department Chairman.

### HSS

### 499 Special Topics (1-5)

Special topics in humanities and social sciences to be offered occasionally by permanent or visiting faculty. May be repeated for credit.

### INDUSTRIAL ENGINEERING

For a description of courses required in this curriculum, see "College of Engineering" in the "Programs of Study" section of this catalog.

### **MECHANICAL ENGINEERING**

### **Courses for Undergraduates**

### ME

### 215 Statistical Methods in Engineering (3) AWSp

Roberts

Applications of elementary probability theory and statistics to engineering problems; continuous and discrete distributions, elementary statistical decision making; application of the least squares technique. Prerequisite, Mathematics 124.

### ΜE

### 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.

### МE

### 302 Welding (2) AWSp Holt

Introduction to the art and science of thermal metal-joining processes; weld design, sequence, and distortion. Primarily for students majoring in industrial education or industrial design. Lecture and laboratory.

### МE

### 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.

### ME

### 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.

### ME

### 308 Production Methods (3) Sp Holt

Principles and application of thermal and mechanical processes in the production of manufactured parts. Lecture and laboratory. Prerequisite, 304.

### ΜE

### 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.

### ME

### 320 Thermodynamics I (4) AWSp Waibler

Introduction to classical macroscopic thermodynamics, including development of the basic laws applicable to energy transformations, with reference to engineering applications. Prerequisites, Mathematics 126 and Chemistry 140, or permission.

### ME

### 322 Microscopic Thermodynamics (4) Sp Roberts

Introduction to kinetic theory and statistical thermodynamics. A preliminary treatment of transport phenomena, mathematical probability statistics and relevant mathematical procedures. Prerequisite, 320 or Engineering 260.

### ME

### 323 Thermodynamics and Heat Transfer (4) AWSp

Depew

Application of thermodynamic principles to power and refrigeration cycles. Study of reacting and nonreacting mixtures, chemical reactions, phase and chemical equilibria. Applications to combustion and fuel cells. Brief introduction to principles of heat transfer. Prerequisite, 320 or Engineering 260.

### ME

### 331 Introduction to Heat Transfer (4) AWSp McFeron

Study of heat transfer by conduction, radiation, and convection; elementary heatexchanger design. Prerequisites, 320 or Engineering 260, and 333 or CIVE 342, or permission.

### ME

### 333 Introduction to Fluid Mechanics (4) AWSp Gessner

Introduction to the basic fluid laws and their application. Conservation equations, dynamic similarity, potential flow, boundary layer concepts, effects of friction, compressible flow, fluid machinery, measurement techniques. Prerequisites, 320 or Engineering 260, and Mathematics 238.

### ME

### 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.)

### МE

### 343 Behavior of Engineering Materials (4) AWSp Sandwith

Study of the nature, properties, and behavior of engineering materials, involving strength, deformation, fracture, impact, creep, fatigue, and corrosion. Lecture and laboratory. Prerequisite, 352 or permission; Engineering 170 recommended.

### ME

### 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, Mathematics 126 and Engineering 180.

### ME

### 353 Mechanical Design Analysis (3) AWSp Kieling

Analysis, design, and selection of mechanical subsystems and elements, such as gears, linkages, cams, and bearings. Lecture and laboratory. Prerequisites, 343 and 352.

### ΜE

### 365 Dynamics (4) AWSp Merchant

Newtonian dynamics from a vector point of view, with topics applicable to mechanical design. Prerequisites, Engineering 180 and Mathematics 126.

### МE

### 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, Mathematics 238 and Engineering 180.

### ME

### 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.

### МE

### 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. Prererequisites, 304 and 343, or permission.

### ME

### 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.

### ME

### 404 Theory of Welding (3) W Holt

Theory of arc welding and flame cutting of metals. Prerequisites, 304 and 343, or permission.

### ΜE

### 406 Corrosion and Surface Treatment of -Materials (3) W Sandwith

Corrosion, plating, coating, welding, diffusion bonding, carburizing, and nitriding, from the standpoint of solid-state diffusion theories, adhesion theories, and phase equilibria. Prerequisite, 343 or permission.

### ME

### 410 Engineering Administration (3) AWSp Drui

Overview 'of the operations of an industrial organization, interrelationship of functions, and fundamental principles of management that lead toward effective coordination and control. Lectures and case studies in industry.

МE

### 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.

### ME

# 412 Industrial Cost Analysis (4) AW

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.

### ME

### 413 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.

### ΜE

### 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.

### ME

### 415 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 417 Work Systems Design (4) AW Drui

Work design and measurement principles; time utilization, flow and operations studies, principles of motion economy, time study



M

principles and practices, physiological and psychological aspects of work. Lectures and studies in local industry as laboratory. Corequisite, Humanistic-Social Studies 300.

### ΜE

### 418 Work Simplification (2) Sp Drui

Work study in service industries. Principles of motion economy; work distribution and human-activity analysis; flow-process charts and diagrams; layout of work areas; economic and human factors. Lecture and local business laboratory. Corequisite, Humanistic-Social Studies 300.

### ME

### 419 Work Environment Design (3) WSp Drui

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.

### ME

### 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.

### ME

### 425 Air Conditioning (3) W Crain

Theory and practice in the field of heating, ventilating, and air conditioning, including psychometry, air distribution, humidity and temperature control, cooling and dehumidifying equipment, and air cleaning. Prerequisite, 323.

### МE

### 428 Noise Control (3) W Chalupnik

Introduction to design for noise control. Includes summary of acoustical phenomena as pertains to noise control and measurement. Noise rating schemes, particularly in relation to machine noise in the work environment. Prerequisite, junior standing in engineering.

### ME

### 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 Engineering 260.

### ΜĒ

### 432 Gas Dynamics I (3) Sp Childs

Dynamic and thermodynamic relationships for the flow of a gas. Application of thermodynamic processes involving nozzles, diffusers, compressors, and turbines. Prerequisites, 320 or Engineering 260, and 333 or CIVE 342.

### ME

### 433 Turbomachinery (4) W Firey

Basic principles of turbomachinery operation, design, and testing. Prerequisite, 333 or CIVE 342, or permission.

### ME

### 434 Advanced Mechanical Engineering Laboratory (3) Sp Crain

Planning and interpreting engineering experiments on prime movers, refrigerators, and other thermal equipment. Design and operation of complete multicomponent plants. Lecture and laboratory. Prerequisite, 323.

### ME

### 436 Friction and Lubrication (3) A Firev

Fundamental principles of friction and lubrication with applications to bearing design and materials selection. Prerequisite, senior standing in engineering or permission.

### ΜE

### 440 /Mechanical Behavior of Solids (3) A Wolak

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.

### ΜE

### 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.

### ΜE

### 451 Human Factors in Design (3) W Walker

Engineering considerations of the abilities and limitations of the human operator in the design of industrial systems and components. Functional, psychological, physiological, and environmental aspects.

### ME

### 460 Kinematics and Linkage Design (3) W Kieling

Synthesis of linkage-type mechanisms, using graphical and computer methods. Prerequisite, senior standing in engineering, or permission.

### ΜE

### 464 Analytical Methods in Engineering (3) A Balise

Mathematical methods in modern engineering problems, emphasizing computer solutions. Transformations, discrete-variable problems, and matrix methods. Theory and applications in various areas of mechanical engineering, with use of the computer. Prerequisite, 373 or permission.

#### ME 465 W

### 165 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.

### ME

### 469 Applications of Dynamics in Engineering (3) AWSp

Sherrer

Applications of the principles of dynamics to selected engineering problems, such as suspension systems, gyroscopes, electromechanical devices. Includes introduction to energy methods and wave propagation in fluids and solids. Prerequisites, 365 or Engineering 230, and 373 or permission.

### МE

### 470 Mechanical Vibrations (3) Sp Merchant

Single-degree-of-freedom linear systems techniques. Matrix techniques for multi-degree-offreedom linear systems. Applications in vibration isolation, transmission, and absorption problems and instrumentation. Prerequisite, 373 or permission.

### ME

### 471 Automatic Control (3) ASp Galle

Automatic control system analysis. Dynamic system modeling; identification of the control problem; stability analysis by Routh, Nyquist, Bode, and root locus techniques. Lecture and laboratory. Prerequisite, 373 or permission.

### ΜE

### 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.

### МE

### 474 Systems Modeling and Simulation (3) W Balise

Use of graphical methods as a unified approach to modeling of systems, and computer simulation of systems behavior. Consideration of systems with linear and nonlinear behavior, lumped and distributed properties. Case studies of engineering, biological, and socioeconomic systems. Prerequisite, 464 or permission.

### ME

### 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.

### ΜE

### 481 Internal Combustion Engines (3) ASp Guidon

Study of Otto and Diesel cycles; fuels, carburetion, ignition, combustion, and engine performance characteristics. Prerequisite, 323 or permission.

### ME

### 482 Internal Combustion Engine Laboratory (3) W

Firey

Laboratory experiments on gasoline and diesel engines and gas turbines with analysis and interpretation of results. Effects of principal design and operating variables. Prerequisite, 481 or permission.

### ME

### 483 Internal Combustion Engine Design (3) Sp

Firey

Fundamental principles of engine design and materials selection, including preliminary design of essential components of an engine. Lecture and laboratory. Prerequisite, 481.



### ME

Rocket Propulsion (3) W 485 Guidon

Study of the types of rocket engines; thermodynamic relations and nozzle theory; charactéristics of gaseous, liquid, and solid propellant systems; rocket testing; performance calculations. Prerequisite, 323.

### ME

### 490 Naval Architecture (3) A Adee

Theory of naval architecture; ship's lines, hydrostatic curves, intact and damaged stability, launching. Prerequisite, junior standing in engineering or permission.

### ME

### 491 Naval Architecture (3) W Adee

Theory of naval architecture; strength, A.B.S. rules, water waves, ship and platform motions, Prerequisite, junior standing in engineering or permission.

### ME

#### 492 Naval Architecture (3) Sp Adee

Theory of naval architecture; dimensional analysis, resistance model testing, propellers, steer-ing. Prerequisite, junior standing in engineering or permission.

### ΜE

### 495 Mechanical Engineering Design (4) 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, 394 and senior standing in mechanical engineering.

### ME

### Special Topics in Mechanical Engineering (1-5, max. 6) AWSp 498

Lecture and/or laboratory. Maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite, permission.

### ME

499 Special Projects (2-5, max. 9) AWSpS Prerequisite, permission of department Chairman.

### **Courses for Graduates Only**

### ME

#### 501 Advanced Materials Processes (3) A Sandwith

Consideration of hot and cold fabrication processes with respect to their effects on the mechanical properties of engineering materials. Fundamental aspects of strengthening, anisotropy, and thermal stability in materials processing. Prerequisite, graduate standing in engineering or permission.

### ME

#### Plastic Metal Forming (3) Sp 502 Wolak

Stress-strain and stress-strain-rate relations in metal forming; plastic instability. Work of deformation. The slip-line field. Load bounding. Metal characteristics and forming. Applications to basic metal forming processes. Prerequisite, 552 or permission. (Offered even-numbered years.)

### ME 506 Friction and Wear (3) Sp

## Firey, Wolak

Nature of the processes of friction and wear. Temperature rise at contact surfaces during sliding, and resulting wear. Boundary friction. Friction and antifriction materials. Prerequisite, graduate standing in engineering or permission. (Offered odd-numbered years.)

### ME

**Advanced Topics in Engineering** 516 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, timeseries analysis. Prerequisite, graduate standing or permission.

### ME

### 518-519-520 Seminar (0-0-1)

### ME

#### 521 Thermodynamics III (3) A Depew, Emery, Waibler

Fundamental concepts of temperature, thermodynamic properties, and systems. The first, second, and combined laws. Development of the relations of classical thermodynamics. Prerequisites, 323 and graduate standing in mechanical engineering or permission.

### ΜE

#### 522 Thermodynamics IV (3) W

Corlett, Depew, Emery, Roberts, Waibler Topics from statistical thermodynamics, including the Boltzmann, Bose-Einstein, and Fermi-Dirac statistics. Solutions of the Schrödinger wave equation and evaluation of the partition function for translation, rotation, and vibration. Prerequisite, 521 or permission. (Offered odd-numbered years.)

### ME

Combustion (3) W 524

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.)

### ME

### 525 Acoustics in Engineering I (3) W Chalupnik, Merchant

Acoustic wave transmission, reflection, refraction, and diffraction. Review of continuum mechanics and examples from electromechanical systems. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 525. Prerequisite, graduate standing in mechanical or electrical engineering, or permission.

### ΜE

### Acoustics in Engineering II (3) Sp 526

Chalupnik, Merchant Continuation of 525. Material differs each year, covering such topics as scattering, moving media, ultrasonics, acoustic holography. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 526. Prerequisite, 525 or permission.

### ME

#### 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 the Department of Civil Engineering as CEWA 528. Prerequisite, permission.

### МE

# 530 Radiative Heat Transfer (3) W

Corlett, Depew, Emery, McFeron Fundamentals of thermal radiation for black, gray, nongray, diffuse, and specular surfaces. Gaseous radiation and special applications of thermal radiation. Prerequisite, graduate standing in mechanical engineering or permission. (Offered even-numbered years.)

### ME

### 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.)

### ME

# 532 Convective Heat Transfer (3) Sp 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.)

### ΜE

### 533, 534 Gas Dynamics (3,3) W,Sp Bodoia, Childs, Gessner

Dynamic and thermodynamic relationships for the flow of fluids; application of basic laws to flow processes in pipes, nozzles, diffusers, compressors, turbines; wave phenomena; multidimensional flow; unsteady flow; processes involving chemical reactions.

### ME.

### 535 Computational Techniques in Heat Transfer (3) A

Corlett, Depew, Emery, Kippenhan, McFeron, Waibler

Advanced heat transfer studies of interest to mechanical engineers. Subject coverage varies from year to year. Prerequisite, permission. (Offered odd-numbered years.)

### ME

#### Laminar Boundary Layer Theory (3) Sp 537 Bodoia, Childs, Gessner

Development of the equations of motion for laminar viscous flow; characteristics of zero, favorable and adverse pressure gradient flows; flow separation. Analytical techniques for exact solutions of the Navier-Stokes equa-tions; development of the boundary layer equations; methods of solution by similarity and momentum integral techniques; thermal boundary layers and compressibility effects; new developments and methods of solution. (Offered even-numbered years.)

### ME

#### **Turbulent Boundary Layer Theory (3) A** 538 Boddia, 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

# M

of solution based on higher order constitutive equations; application to diffuser flows and free shear flows; new developments and physical models. (Offered even-numbered years.)

### МE

### 541 Advanced Engineering Materials (3) W Daly, Mills, Taggart

Behavior of engineering materials as affected by various conditions of loading and environment. Lecture, laboratory. Prerequisite, graduate standing in mechanical engineering or permission.

### ME

### 542 Topics in Engineering Materials (3) Sp Daly, Mills, Taggart

Selected topics of current importance concerning the nature and behavior of engineering materials. Lecture, laboratory. Prerequisite, 541 or permission.

### ME

### 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 the Department of Chemical Engineering as 543, 544. Prerequisite, 6 credits in graduate fluid mechanics. (Offered Autumn Quarter in odd-numbered years, Winter Quarter in even-numbered years.)

### ME

### 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.

### МE

### 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.

### ME

### 553 Applied Viscoelasticity (3) Sp

Emery, Kobayashi, Osborn, Sherrer Time-dependent aspects of stress and strain, and stability in mechanical engineering design. Stress analysis in the présence of creep and stress relaxation. Cyclic variation of load and temperature. Prerequisite, 551 or permission.

### МE

### 554 Advanced Theory of Plasticity (3) Sp Kobayashi

Basic equations for three-dimensional problems of perfectly plastic and strain hardening materials. Variational principles in plasticity and their application to numerical analysis of elastic-plastic problems. Discussion of advanced topics from recent literature. Prerequisite, 551 or permission. (Offered oddnumbered years.)

### ME

### 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 evennumbered years.)

### ME

### 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.

### ME

### 557 Experimental Stress Analysis (3) W Day

Continuation of 556 with extended applications and theory of experimental mechanics techniques. Holography; residual stress analysis methods; moire; three-dimensional photoelasticity; acoustoelasticity. Lecture and laboratory. Prerequisite, 556 or permission.

### ME

### 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.)

### ME

### 559 Fracture Mechanics (3) W Kobayashi

Applications of linear fracture mechanics to failure analysis and fracture control based on actual case studies. Fracture toughness and fatigue testing techniques, crack initiation and fatigue life prediction of mechanical components subjected to environmental effects.

### ME

### 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.)

### ME

### 564 Mechanical Engineering Analysis I (3) A Balise, Galle, Jorgensen, Osborn

Application of mathematical methods to the description and analysis of systems in mechanical engineering. Analogies in heat transfer, fluid flow, stress distribution, dynamics, and feedback control. Prerequisite, graduate standing in mechanical engineering or permission.

### ΜE

### 565 Mechanical Engineering Analysis II (3)

Balise, Galle, Jorgensen, Osborn Applications of vectors, matrices, and partial differential equations to mechanical engineering systems, including computational techniques and analogies. Prerequisite, graduate standing in mechanical engineering or permission.

ME

### 567 Advanced Dynamics (3) Sp

Chalupnik, Merchant, Sherrer Dynamics of particles and of rigid bodies. Generalized coordinates, Lagrange's equations, Hamilton's principle. Prerequisite, graduate standing in mechanical engineering or permission.

### ME

### 568 Analytic Methods in Vibrations (3) A Balise, Chalupnik, Merchant, Sherrer

Analysis of vibration phenomena in multidegree-of-freedom and continuous systems. Prerequisite, graduate standing in mechanical engineering or permission.

### ME

### 571 Servomechanisms I (3) W Balise, Galle, Jorgensen

Linear and introductory nonlinear feedback system analysis and design. Prerequisite, 471 or permission.

### ME

### 572 Servomechanisms II (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.

### ΜE

### 575 Systems Theory (3) Sp Balise, Galle

State variable approach as applied to the analysis and synthesis of systems. System state vectors, response matrices, simulation diagrams, controllability and observability. Geometrical and physical interpretations of the mathematical methods. Prerequisite, 565 or permission.

ME

### 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.

### МE

### 584 Gas Turbines (3) Sp

Boddia, Guidon Applications of the gas turbine; gas turbine cycles; 'compressors; turbines; combustion systems, gas turbine power plant materials; plant performance. Prerequisite, graduate standing in engineering or permission. (Offered even-numbered years.)

### ME

### 589 Nonlinear Mechanical Vibrations (3) W Chalupnik, Merchant, Sherrer

Systems with nonlinear damping and restoring forces, applications of the phase-plane delta and the Ritz averaging methods, and stability of nonlinear oscillations. Prerequisite, 568 or permission.

ME

### 590 Random Mechanical Vibrations (3) Sp Chalupnik, Merchant, Sherrer

Problems in measuring random vibrations, in designing simulation equipment, and in mechanical design, for random vibration in aircraft and missiles. Prerequisite, 568 or permission.

### ME

### 598 Topics in Research (1) AWSp

Doctoral seminar. May be repeated for credit.

ΜE

### 599 Special Projects (1-5, max. 9) AWSpS

"Prerequisite, permission of department Chairman.

### ENGINEERING
### ENGINEERING

#### ME

600 Independent Study or Research (\*) AWŠpS

ME

700 Master's Thesis (\*) AWSpS

ME

.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.

#### **CER E**

#### 199 Materials Analysis (1) AWSpS Mueller

Practical use of optical and electron micros-copy, X-ray diffraction, X-ray spectroscopy, electron microprobe, and scanning electron microscope in the analysis of common engineering materials.

#### CER E

202 Ceramic Engineering I (2) W Mueller

Scope of ceramic materials and ceramic industries; use of ceramics as engineering materials; economic importance.

#### CER E

Ceramic Engineering II (2) Sp 203

Campbell Theory and methods used in measuring proper-

ties of ceramic materials; control of ceramic processes.

#### CER E

## 300 Introduction to Ceramic Engineering (5)

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.

#### **CERE**

#### 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 (4) W Miller

Transport in ceramic processing systems; fluid flow, heat flow, mixing, and applications of drying, firing, and pyrometry.

#### **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 proch ucts.

#### CER E

#### 306 Ceramic Engineering Excursion (1) A Campbell

Plant inspection trip. Prerequisite, junior standing.

#### **CER E**

307 Ceramic Engineering Excursion (1) A Campbell

Plant inspection trip. Prerequisite, senior standing.

#### CER E

#### 311 Physical Ceramics I: Equilibria (3) W Scott

Phase diagrams, thermodynamics of heterogeneous equilibrium, nonequilibrium processes, and the interpretation of three component diagrams.

#### CER E

312 Physical Ceramics II: Microstructure and Kinetics (4) W Sarian

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** Sarian

Thermal and optical properties; plastic deformation; elasticity and strength; electrical conductivity; dielectric and magnetic properties.

#### **CERE**

#### 322 Microscopy of Ceramics (3) W 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) A

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.

#### CER E

#### 402 Equipment and Plant Design (2) W Campbell

Calculation and design of processing equipment.

#### CER E

#### **Ceramic Process Analysis (3) Sp** 403 Whittemore

Case histories of ceramic industrial facilities. Plant visits. Economic factors and overall process integration, including raw materials, processes, fuels, personnel, distribution.

468

### **CER E**

#### 409 Ceramic Materials Laboratory (1) A 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 Fischbach

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 cementi-tious 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

#### 441 Undergraduate Seminar (1) A Miller

Employment selection. Résumé writing and correspondence, personnel contacts, interview planning and job selection campaign.

#### CER E

#### 442 Experience in the Arts (1) W Leahy, Mueller

Informal experiences with the arts through attendance at theatres, concerts, art exhibits, etc.; through discussions with creative artists; and through personal attempts at producing a work of art. Offered jointly with the Department of Humanistic-Social Studies as Humanistic-Social Studies 461.

#### CER E

### 443 Undergraduate Seminar (1) Sp

Campbell Discussion of research and problems.

#### CERE

#### 450 Introduction to Carbon Materials (3) Sp Fischbach

Nature and capabilities of crystalline and disordered forms of pure carbon as engineering materials. Influence of structure on behavior. Preparation methods, structure and properties of diamond; synthetic and natural graphites; glassy, coke, pyrolytic, black, and fiber carbons.

Philosophy of experimentation; error analysis;

vacuum technique; production and measure-ment of high temperatures; selected topics in

advanced experimental techniques. (Formerly

#### **CER E**

503.)

#### 455 Research Techniques (3) A

, Fischbach

# M

#### **CERE**

#### 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

Problems in ceramics; laboratory investigations and bibliograpic research. A total of 5 credits is required.

#### **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 and its application to industrial production.

#### **CER E**

#### 511 Advanced Physical Ceramics I (3) A Sarian

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 Advanced Physical Ceramics II (3) Sp Miller

Physical and thermal properties of multiphase materials. Simple and complex mixture rules. Mechanical properties of multiphase materials. Enhancement of properties by material design. Production of preferred microstructure by special processing. Composite materials including cermets and oriented composites involving ceramics.

#### 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 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.

#### CERE

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 the Department of Nuclear Engineering as Nuclear Engineering 444. Prerequisite, Engineering 170 or equivalent.

#### METALLURGICAL ENGINEERING

#### **Courses for Undergraduates**

#### MET E

198 Career Planning in Metallurgy (1) WSp Stoebe

Introduction to the field of metallurgical engineering. Includes interdisciplinary aspects of the field, lecture-demonstrations, introduction to laboratory tools and techniques, and discussions on curriculum and career opportunities with current students.

#### MET E

#### 201 Modern Metallurgy (2) ASp Jones

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 Jones

Continuation of projects started in 201. Prerequisites, 201 and permission.

#### MET E

#### 301 Metallurgical Systems and Instrumentation (3) A

Archbold

Instrumentation, equipment, and laboratory techniques in metallurgical engineering. Metallographic laboratory practice, mechanical property measurements, X-ray generation and detection, heat generation and control, vacuum methods. Laboratory experiments designed to illustrate basic metallurgical principles.

#### MET E

**306** Metallurgy Excursion (1, max. 2) Sp Plant inspection trip junior and senior year. Required of all majors.

#### MET E

## 322 Metallurgical Thermodynamics (3) A Jones

Quantitative application of thermodynamics to systems of interest to metallurgists. A detailed review of thermodynamic quantities and equations of state.

#### MET E

#### 323 Metallurgical Transport Phenomena (3) W

#### Jones

Introduction to the principles of momentum, heat, and mass transfer. Review of the principles of chemical kinetics. Application of transport phenomena to systems of metallurgical interest. Prerequisite, 322.

#### MET E

#### 325 Extractive Metallurgy I (4) W Brien

Physical and chemical principles of mineral preparation and concentration. 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 II (4) Sp Jones

Application of physical and chemical principles to high-temperature and electrolytic extraction and refining of metals. Descriptions of processes and unit operations, with emphasis on the thermodynamic and kinetic aspects involved. Prerequisites, 322, 323.

#### MET E

361 Structure of Solids (4) A Archbold

Elements of crystallography and the structure of metals and alloys, intermediate phases, superlattices. Theory and application of X-ray and electron diffraction for the determination of crystal structure. Laboratory experiments related to these principles.

#### MET E

#### 362 Properties of Solids (4) W Stoebe

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

Jones, 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

Jones, 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 Hammer

Description of the relationship between technology and areas of current social interest in the context of modern materials science and engineering. Includes discussion of utilization of natural resources, energy and nuclear power, biomedical applications of materials, and new materials and applications in engineering 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 Jones

Application of physical chemistry and transport theory to metal process engineering. Prerequisite, permission. (Formerly 422.)

#### 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. Prerequisite, 363.

#### MET E

#### **460** Advanced Physical Metallurgy (3) Current engineering topics in physical metallurgy. May be repeated for credit.

#### MET E

#### 461 Deformation and Mechanical Behavior of Metallic Systems (3) A

Theories of elastic and plastic behavior of solids. Role of imperfections in mechanical behavior. Yielding, work hardening, strengthening mechanisms, creep, and fatigue. Prerequisite, 362.

#### MET E

#### 462 Engineering Physical Metallurgy (3) W 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 Mechanical Engineering 340.

#### 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

#### 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 Brien

Methods of laboratory investigations and recent plant and process innovations reported in the current literature. Prerequisite, 325.

#### MET E

#### 473 Mineral Process Plant Design (2) W Brien

General arrangement planning and design calculations on a project basis. Prerequisite, 325.

#### MET E

#### 474 Opaque Minerals Microscopy (2) Sp Brien

Microscopic determination of the ore minerals; physical and optical properties, etch reactions; microchemical testing of polished sections; mineral associations, liberation, grain counting.

#### MET E

#### 475 Pollution Control of Metallurgical Plants (3) 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 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

Jones

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.

M

### ENGINEERING

# M

#### 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. Preraquisite, 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) A Polonis

Thermodynamics and kinetics of solid-state reactions in metals, phase stability, theories of nucleation and growth, precipitation from solid solutions, applications to specific metal and alloy transformations.

#### MET E

#### 562 Phase Transformations in Metals and Alloys II (3) Polonis

Theory of transformation processes in solids, with emphasis on energetics and structural mechanisms; melting and freezing, role of imperfections in solid-state reactions, martensite transformation, eutectoid decomposition, cellular precipitation.

#### MET E

#### 563 Phase Transformations in Metals and Alloys III (3) 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 diamagnetism, 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 semiconduction 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

Brien

Special topics of current interest in the preparation and concentration of minerals; the application of physical and surface-chemical fundamentals in investigative research, ratecontrolling mechanisms in hydrometallurgy.

#### MET E

571 Advanced Mineral Processing Theory I (3) W Brien

Thermodynamics and electrochemistry of surfaces. Potential differences across interfaces; electrical double layer, surface tension; Gibb's adsorption equation in three-phase flotation systems; anionic and cationic selectivity; ion exchange and solvent extraction.

#### MET E

572 Advanced Mineral Processing Laboratory (\*) S

#### Brien

Experimental study of theoretical principles in preparation, concentration, and hydrometallurgy.

#### MET E

599 Special Topics in Métallurgy (\*) AWSpS

#### MET E

600 Independent Study or Research (\*) AWSpS

#### MET E

700 Master's Thesis (\*) AWSpS

#### MET E

800 Doctoral Dissertation (\*) AWSpS

#### MINING ENGINEERING

#### **Courses for Undergraduates**

#### MIN E

221 Explosives and Rock Drilling (2) W Anderson

Principles of rock breaking and characteristics of explosives. Theory of fragmentation; design of blast and explosive loading patterns; nuclear explosives in industry; safe practices, and elements of costs. Applications in tunneling and surface work.

#### MIN E

#### 306 Mine Excursion (1, max. 2) Sp

Five, day trip to a neighboring mining region. Required in junior and senior years during spring vacation, or as scheduled.

#### MINE

#### 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.

#### MIN E

#### 325 Mineral Land Valuation (2) W Anderson

Sampling methods in mines and placers; drill hole and coring methods; geological aspects; estimation of deposits and reserves; use of computers in ore reserve calculations; metallic and nonmetallic depletion and financial calculations; reports. Prerequisite, 322 or permission.

#### MIN E

#### 330 Mine Surveying (3) Sp Anderson

Practice in underground methods, use of special instruments, stope measurements, shaft surveying, solar observations, and carrying of meridian underground; production of working and geologic maps and sections.

#### MIN E

#### 350 Mineral Resource Development, Production, and Valuation (5) A Anderson

Underground and surface excavation of rock; theory of fragmentation and use of explosives as applied to tunnels and surface mining. Principles of mineral production, including delineation of ore bodies; underground and surface planning; production costs, including labor and productivity studies. Mineral land valuation; geologic aspects; estimation of ore reserves by sampling, core drilling; financial calculations. Prerequisite, Geological Sciences 101 or 205 or Engineering 140 or permission.

#### MIN E

#### 426 Exploration and Development of Mineral Deposits (4) Sp Anderson

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.

#### MIN E

#### 432 Mine Plant Design (5) Sp Anderson

Principles and application; design of transport systems; air compression practice and distribution; pumping plant and mine water handling; electrical equipment and distribution systems in mines; plant design and construction. Prerequisites, 322 and Electrical Engineering 306.

#### MIN E

#### 433 Environmental Control in Mines (3) A Anderson

Anaerson Principles and practices. Physical and chemical aspects of mine atmosphere, gases, and dusts; physiological considerations; air flow and measurement; mechanical ventilation, and air conditioning equipment and systems. Prerequisite, 322.

#### MIN E

#### 481 Mineral Industry Economics (3) W Anderson

World mineral resources, their distribution, exploitation, and depletion; social, economic, and political effects; international control and trade, industrial organization, government policies, taxation, tariffs, marketing, and pricing; elements of production costs. Offered jointly with the Department of Geological Sciences as Geological Sciences 481. Prerequisite, Economics 211.

#### MIN E

499 Special Projects (\*, max. 5) AWSp Problems in mining or mineral processing; field or laboratory investigations on an independent basis.

#### **Courses for Graduates Only**

#### MIN E

520 Seminar (1, max. 6) AWSp

Lectures and discussions; review of research problems and recent literature. Required for all graduate students.

#### MIN E

521 Mining Systems (\*) AWSp Anderson

Production methods; mining control; support; applied efficiency methods; administration; equipment and machinery; health and safety; special problems. Arranged in accordance with student's major interest.

#### MIN 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.

#### MIN E

**551** Special Topics (3-5, max. 15) AWSp Topics of current interest and importance in the mineral industries or individual study on a subject of special interest.

#### MIN E

600 Independent Study or Research (\*) AWSp

MIN E

700 Master's Thesis (\*) AWSp

### NUCLEAR ENGINEERING

#### **Courses for Undergraduates**

NUC E

400 Introduction to Nuclear Reactor Analysis (4) A

Albrecht

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, Physics 327 and Mathematics 238.

#### NUC E

#### 444 Nuclear Materials (3) W Miller

Structure, properties, and performance of materials in nuclear reactor applications; engineering requirements and selection of materials for reactors; technology of materials for reactor fuels, moderators, shields, control elements, and structural components; corrosion and oxidation; effects of radiation on the structure and properties of materials. Offered jointly with the Department of Mining, Metallurgical, and Ceramic Engineering as Materials Engineering 444. Prerequisite, Engineering 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 the Department of Radiology as Radiology 477.

#### NUC E

484 Introduction to Nuclear Engineering (4)

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, Mathematics 238 or permission.

#### NUC E

#### 485 Nuclear Instruments (3) W Robkin, Woodruff

Lecture and laboratory devoted to the principles of measurement and detection of various types of radiations encountered in nuclear energy systems. Laboratory demonstrations include the use of Geiger, proportional, and scintillation detectors; ionization chambers; analog-digital data logging equipment; proportional, solid-state, and multichannel analyzers. Sources of radiation include the 100-kw. UW nuclear reactor and pulsed neutron generators. Typical applications of neutron activation analysis and various radioactive tracer techniques in medicine, oceanography, forensic science, and engineering also are presented. Prerequisite, junior or senior standing.

#### NUCE -

486 Nuclear Power Plants (3) Sp . Babb

Applications of nuclear energy to power generation. Discussions of various types of nuclear reactor systems include pressurized water, boiling water, high temperature gas cooled, sodium graphite, as well as advanced 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 decribed, 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 nonliving systems. Offered jointly with the Department of Radiology as Radiology 487. Prerequisite, permission.

#### NUC E

#### 488 Nuclear Systems Design I (4) W Babb, Chalk, Garlid

Design laboratory involving the synthesis of nuclear technology, engineering analysis, ma-

terial specifications, and economics to meet the design specifications for modern nuclear industry applications. Prerequisite, 400 or 484.

#### NUC E

#### 489 Nuclear Reactor Laboratory (3) Sp Chalk, Woodruff

Laboratory designed to acquaint the student with fundamental measurement techniques for the magnitude of energy and number flux of various radiations under most environmental conditions. Experimental verification of fundamental nuclear and nuclear reactor parameters using the University nuclear reactor facilities. Selected experiments are performed to demonstrate practical applications of nuclear energy in medicine, oceanography, forensic science, and engineering. Prerequisite, 400 or 484.

#### NUC E

#### 498 Special Topics in Nuclear Engineering (1-6, max. 6) AWSpS

Discussions, conferences, and lectures on topics of current interest in nuclear fission and fusion engineering. Prerequisite, permission of department Chairman.

#### NUC E

#### 499 Undergraduate Research Projects (1-6, max. 6) 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) Sp Chalk, Woodruff

Advanced laboratory course in which experimental research is conducted. Selected experiments are performed that involve the use of such equipment as the reactor as a neutron and gamma ray source, pulsed neutron generator, helical neutron monochrometer, neutron diffraction spectrometer, pile oscillator, pile-noise, analysis equipment, time-of-flight equipment, and analog, and digital computers. Prerequisite, 485 or permission.

#### NUC E

#### 510 Nuclear Reactor Engineering (3) A Babb

Advanced course in engineering analysis of nuclear reactor systems. The course covers core design methods; heat generation and distribution in nuclear reactor systems; the removal and utilization of heat for power production; fuel cycles; shielding of nuclear radiations. Prerequisite, 500, which may be taken concurrently.

#### NUC E

#### 512 Nuclear System Design (4) W Babb, Chalk, Garlid

Design laboratory involving the synthesis of reactor theory, engineering analysis, material specifications, and economics in the conceptual and preliminary designs of systems, facilities, or processes. Projects are selected from topics of current interest, and one usually engaged by team effort. Prerequisite, 510.

#### NUC E

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 I (4) W **McCormick** 

Covers the Boltzman equation for neutrons and offers an introduction to the solution of one-speed model problems. Emphasis is placed upon the multigroup spherical harmonics and the discrete ordinate techniques. Prerequisite, 500.

#### NUC E

#### 531 Nuclear Reactor Statics II (3) Sp **McCormick**

Adjoint equation, perturbation theory, and variational methods are considered; other topics include neutron thermalization, resonance absorption, applications of theory to practical problems. Prerequisite, 530.

#### NUC E

## 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

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 safe-guards, thermal effects, control of radioactivity releases, biological response to radiation, environmental monitoring, evaluation of new energy sources and energy conversion systems. Offered jointly with the Department of Radiology as Radiology 540, 541.

#### NUC E

Neutron Transport Theory (3) A 550 **McCormick** 

Exact solutions of specialized neutron transport problems and relationship of the results to those obtained by approximate techniques are considered; additional topics include synthesis methods and Monte Carlo techniques. Prerequisite. 531.

#### NUC E

#### 556 Introduction to Plasma Theory (4) W 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 electro-magnetic fields, plasma kinetic theory, transport phenomena, development of various fluid models, and waves in plasma.

#### NUC E

#### Plasmas and Controlled Fusion (3) Sp 557 Vlases

Emphasis on the problem of controlled thermonuclear fusion. After an introduction to the general problem, the basic principles of mag-

netic confinement, stability, and laser fusion are discussed. Final section deals with a review of current research in this field, including status of currently promising fusion devices. Prerequisite, 556.

#### NUC E

560 Nuclear Reactor Dynamics I (4) W Albrecht

Nuclear reactor dynamic equations, delayed neutron representations, response of reactors to various perturbations, response of reactions to of system analysis, feedback mechanisms, stability criteria, power coefficients. Prerequisites, 500, Mathematics 427, 428 or permission.

#### NUC E

#### 561 Nuclear Reactor Dynamics 11 (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 neu-tronics, 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 (\*) AWSD

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 Chairman.

#### NUC E

600 Independent Study or Research (\*) AWSpS

#### NUC E

700 Master's Thesis (\*) AWSpS

#### NUC E

800 Doctoral Dissertation (\*) AWSpS

### **OCEAN ENGINEERING**

#### **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**

#### 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.

## 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 nonmajors.

#### FISH

#### 311 Functional Anatomy of Fish and Shellfish (4) A Smith

Diversity in the structure, function, and habits of fishes viewed as an expression of variations in their biological and physical environment. Prerequisite, 10 credits in biology.

#### FISH

## 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 envi-ronment. Prerequisites, 5 credits in fisheries.

#### FISH -

#### Applications of Digital Computers to Biological Problems (4) AW 340 Bevan

Methods and procedure for processing bio-logical data by means of digital computers; problem analysis, elementary programming, use of package programs for statistical analysis. Prerequisite, Quantitative Science 281 or 381.

#### FISH

#### 367 Recreational Fisheries (3) WS

History of recreational fishing; present trends in sport fishing and prediction of future trends; types and characteristics of recreational fisheries; value of recreational fisheries; habitat requirements; ecology and behavior that are important considerations in management; management philosophy and techniques. Prerequisite, 10 credits of biology.

#### FISH

#### 379 Fisheries of the World (3) A Van Cleve

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

**Classification of Economically Important** 401 Fishes (5) ASpS Welander

Classification, identification, and distribution of fishes. Prerequisite, 10 credits in biology.

### FISH

#### 405 Economically Important Mollusca (5) A Chew

Classifications, life histories, distribution, methods of cultivation, and economic impor-tance 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. Pre-requisite, 10 credits in biological science.

#### 425 Life History of Marine Fishes (5) W

Fecundity, spawning, incubation, and hatching of marine fishes; identification and survival of larvae and juveniles; food and feeding of adults; migration; recognition of subpopulations. Pre-requisite, 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. Prerequi-site, permission. (Formerly 530.)

#### FISH

#### Ecological Effects of Waste Water (4) A 434 Welch

Principles of aquatic ecology with emphasis on aspects related to water-quality problems and methods of measuring associated biologi-cal changes. Topics include: introduction to aquatic ecology, distribution of chemicals and their role in metabolism, nutrient cycles and effects of natural and man-caused changes in environmental factors on aquatic plant and animal communities. Offered jointly with the Department of Civil Engineering as CEWA 434.

#### FISH

#### 435 Physiological Effects of Water Pollutants (3) Sp

Brown, Welch

Physiological effects of water pollutants on economically important or endangered fishes, especially with respect to waste water. Types of industrial, urban, and agricultural entities that contribute wastes to natural waters. Monitoring procedures and assessment of changes in fisheries as a consequence of waste effluents. Offered jointly with the Department of Civil Engineering as CEWA 435. Prerequisites, 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) W

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, Genetics 451 or equivalent.

#### FISH

451 Reproduction of Salmonoid Fishes (5) A Brannon

Spawning and incubation: natural and artificial methods of hatching and rearing, rates of devel-opment; racial strains, and selection; evaluation of procedures; design, structure, and mainte-nance of facilities. Prerequisites, 401 and 10 credits in chemistry.

#### FISH

#### 452 Nutrition and Care of Fishes (5) W Brannon

Basic nutritional requirements of fish in natural and artificial environments; feeding and effi-ciency of diets; nutritional diseases; stocking policies; quality evaluation. Prerequisites, 401 and 10 credits in chemistry.

#### FISH

#### 454 Communicable Diseases of Fishes (5) Sp Chew

Organisms causing diseases in fishes; prevention and known treatments of fish diseases. Prerequisites, 401 and Microbiology 301.

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456 Aquatic Entomology (5) Sp

Laboratory and field course dealing with the taxonomy, ecology, and life history of selected aquatic insects, with special reference to the impact of man on stream systems. Prerequisite, Zoology 331 or Forest Resources 335, or permission.

#### 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

M. C. Bell 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, Mathematics 105, and physics, or permission.

#### FISH

## 463 Principles of Resource Assessment (3) Sp

**463 Principles of Resource** Assessment of *op 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. Pre-requisites, 314, 340, Quantitative Science 281, or permission.

#### FISH

465 Problems in Fish Biology (6) S Taxonomy, ecology, and life history of the fishes of the San Juan Islands and northeast Pacific. Prerequisite, permission. (Offered at Fri-day Harbor Laboratories Summer Quarter only.)

#### FISH

#### Fisheries Management (5) Sp 467 Whitney

Principles and practice of the management of commercial and recreational fisheries. Empractical 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 Quantitative Science 456. Prerequisite, Quantitative Science 281 or 381; Fisheries 340 recommended.

#### FISH

#### 472 Methods of Aquatic Radioecology (3) W Seymour

Methods of radiobiological analyses, of accumulation and loss of radionuclides, and of ra-dionuclides as tracers in aquatic organisms. Prerequisites, 15 credits in chemistry, 10 credits in zoology.

#### FISH

#### 473 Radionuclides in the Aquatic **Environments (3) Sp**

Seymour

The distribution of natural and artificial radionuclides, the allowable concentrations and the biological cost of introducing radionuclides in aquatic environments. Prerequisites, 15 credits in chemistry and 10 credits in zoology.

#### 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.

1

#### FISH

#### 499 Undergraduate Research (1-3, max. 9) AWSp§ .

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 (1-3, max. 3 for M.S., max. 9 for Ph.D.) 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) A Pathological effects and response to injury in invertebrates. The approach is topical (e.g., inflammation, tumors, physical and chemical trauma, and parasitic diseases) rather than phylogenetic. Under each topic, the discussion is phylogenetic and comparative. Prerequisite, permission.

#### FISH

#### 505 Research Techniques in Shellfish Biology (5) W Chew

Study of research methods in field surveys of invertebrates and of research techniques involved with the studies of reproduction, growth, and mortality of oysters and clams. Prerequisite, permission.

#### FISH

#### 506 Shellfish Sanitation (5) Sp Matches

Problems of the shellfish industry with em-phasis on chemical and microbiological contamination and control during culture, harvest, and processing. Prerequisite, permission.

#### FISH

#### 507 Special Problems in Fisheries (1-5. 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) W Smith

Selected experimental techniques in fish physiology. Prerequisite, 515 or concurrent registration.

#### FISH

520 Graduate Seminar (1) AWSp Introduction to research in fisheries.

#### FISH

522 Graduate Seminar in Fisheries

### (1, max. 2) AWSp

Lectures and discussions of current problems and current research in fisheries.

#### FISH

#### 525 Ecology of Marine Fishes (3) Sp

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

#### 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, gen-

#### FISH

ogy, or equivalent.

#### 540 **Application of Digital Computers to** Problems in Aquatic Ecology (3) W Bevan

Laboratory problems adapted to special inter-

eral physiology, biochemistry, or cell physiol-

ests 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

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, Quantitative Science 291. 292, 383, 457, or permission.

## FISH 557 Theoretical Models of Exploited Animal Mathews

Mathematical representation of basic population processes such as growth, mortality, natality, and mobility; application of optimization technique to yield models. Laboratory work on digital computer. Prerequisite, 556 or permission.

#### FISH

#### 558 Estimation of Population Parameters (3) Sp

Mathews

Statistical analysis of population data; design and analysis of mark-recapture experiments on natural populations; laboratory work on digital computer. Prerequisite, 557 or permission.

#### FISH

#### 560 Methods of Stock Assessment (3) W Mathisen

Theory and implementation of processing of fish target signals. Application for estimation of fish stocks and the statistical properties of the estimation procedure.

### FISH

600 Independent Study or Research (\*) AWSp8

FISH

700 Master's Thesis (\*) AWSpS

#### FISH

800 Doctoral Dissertation (\*)

### FOOD SCIENCE

#### **Courses for Undergraduates**

#### FD SC

102 Food—The Technological Challenge (5) A

Reviews the scientific and technological developments leading to the present food supply and food industry. Outlines principles of food science related to preservation, nutritional quality, food safety, and food supply. 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

#### Principles of Fishing Gear and Vessel 378 Development (3) A Jones

Principles of fishing techniques used in the major commercial fisheries related to vessel design and instrumentation required in the operation and handling of specialized fishing gear, together with shipboard experience.

#### FD SC

#### 380 Principles of Fisheries Technology (3) W Liston

Composition of fish; biochemical and micro-biological changes in fish postmortem; nature and effects of processing procedures, analytical control procedures; current technological developments. Prerequisite, Chemistry 102 or 160.

#### FD SC

#### 381 Environment, Food, and Technology (3) Pigott

Principles of process operations for seafood production and consideration of pollution problems arising from food processing wastes.

#### FD SC

#### 481 Introduction to Food Technology (5) Sp Liston

Chemical and biological properties of foods; principles of processing, storage, distribution, and spoilage. Prerequisite, permission.

#### FD SC

#### 482 Principles of Food Analysis I (5) A

Acidity and pH in foods. Methods of proximate analysis. Quantitative analysis of inorganics, lipids, and nitrogeneous substances by physical and chemical methods. Quality assessments and rancidity methods. Prerequisite, Biochemistry 408 or permission.

#### FD SC

#### 483 Principles of Food Analysis II (5) W.

Quantitative analyses of carbohydrates, vitamins, pectins, organic acids, food additives, and chemical contaminants by physical, chemical, enzymic, and microbiological methods. Prerequisite, 482.

#### FD SC

#### 484 Principles of Food Processing I (5) A Liston, Matches

Unprocessed foods, their composition, nutritional availability, associated micro-organisms, storage, and distribution. Prerequisite, 481 or permission.

#### FD SC

#### 485 Principles of Food Processing II (5) W Pigott

Unit operations in food processing, engineering, and technological bases of food operations. Prerequisite, 484 or permission.

#### FD SC

#### 486 Deteriorative Processes in Foods (5) Sp Liston, Matches .

Biochemical, microbiological, physical, and chemical changes occurring in foods. Prerequisites, 483, 485, or permission.

#### FD SC

#### 487 Principles of Food Analysis III (4) Sp Liston

Selected topics in quality assessment of foods. Spoilage, rancidity, organoleptic, and micro-biological methods. Prerequisite, 483.

#### FD SC

498 Undergraduate Thesis (2-6, max. 6) AWSpS

Prerequisite, permission.

FOREST RESOURCES

#### **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.

#### 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 225.

#### 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

#### **Courses for Undergraduates**

#### FOR R

#### 100 Introduction to Forest Resources Management (5) ASp

Dowdle, Waggener

Survey of man's use of forest resources and the impact of social and cultural institutions on resource management. The history and the development of forest conservation and forest utilization practices and policies in the United States. Changing patterns of resource use and methods of resolving conflicts among management alternatives.

#### FOR R

101 Introduction to Wood and Paper (1) W Gardner

Orientation course for freshmen entering curricula in pulp and paper technology and wood and fiber science. The nature of the forest products industries and the role of the two curricula in training for industry and research. Offered on credit/no credit basis only.

#### FOR R

#### 201 Conflicts in Forest Resource Use (2) A Waggener

Analysis of resource management policies, with particular emphasis on the social, political, economic, and resource implications of conflicting resource uses. Examination of major policies and practices designed to deal with conflicting uses, including critical review of operational criteria for resource allocation.

#### FOR R

#### 202 The Conservation Movement—Past, Present, and Future (2) W

Manuwal

Origins of the conservation movement, factors that have shifted its direction, and directions it may take in the near future. Principles relating conservation to society are discussed.

#### FOR R

#### 203 Crisis in the Quality of the Forest Environment (2) W Zasoski

The forest is an essential component of the total environment in a number of essential ways. The facts and fallacies of this relationship are discussed, both in terms of natural processes and of those processes initiated by man.

#### FOR R

#### 204 Public Land Management: Resource Policy in Transition (2) Sp Waggener

Overview of current legislation and policy affecting public land management, with emphasis on the implications for future public land use. Consideration of the major premises established for resource policy, with a critical interpretation of management objectives.

#### FOR R

#### 205 Pollution Problems in the Forest Industries (2) A

Hrutfiord

Considers the causes and the control of pollution problems associated with the forest industries. Air, water, and solid-waste problems are identified during the forest's growth, harvesting, and conversion into the many forest products. The state of the art in controlling these problems is reviewed and future trends are indicated.

FOR R

#### 206 Biocides in the Forest Environment (2) Sp

#### Gara

Analysis of short-term benefits and costs to the forest ecosystem through use of pesticides. Considerations of control alternatives and their consequences to management objectives. A presentation of new trends in forest insect manipulation.

### FOR R

#### 207 Regulation of Environmental Impact in Forest Resource Management (2) W Bradley

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 R

#### 208 Air Pollution and the Forest Environment (2) A

Edmonds

Types and sources of natural and man-made air pollutants, their dispersion in the atmosphere, and their ecological and economic impact on forest ecosystems. Local, regional, and global scales are considered.

#### FOR R

#### 209 Creativity and Innovation (2) W . Allan

Meaning and understanding of the basic nature of creativity and creative thinking. Challenge in thinking and the necessity of creative innovation. Dynamics of thinking and creative thinking. Blocks in creative thinkingemotional, social cultural, economic, environmental, and habitual. Requirements for creative innovation; knowledge, judgment, planning, observation. Techniques of creative thinking and brainstorming, horizontal thinking, design and development of creative games. Computeraided creative thinking in scientific and artistic literature, bargaining and negotiations. Creation of a useful idea, protection and exploitation of a created idea.

#### FOR R

#### 300 Dendrology (5) ASpS Hatheway, Stettler

Concepts of taxonomy, genetics, and organic evolution as applied to the classification of major tree genera of North America; lectures, laboratory demonstrations, and field exercises. Prerequisite, introductory biology or permission.

#### FOR R

#### 301 Forests in the Life of Man (3) W Gessel

The forest ecosystem—forests throughout the world. History of forest use by man. Ecological principles and forest land use. Forest conservation. For nonmaiors.

#### FOR R

#### 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 R

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 R

305 Wood: Properties and Best Use Laboratory (1) WSp

Erickson, Leney

Demonstrations and laboratory experiments on topics presented in 304 that should precede or be taken concurrently.

#### FOR R

#### 310 Forest Soils (5) ASp

Ugolini, Zasoski

Physical, chemical, and biological properties of forest soils; soil development and classification; and soils in relation to use of forest resources. Prerequisite, Geological Sciences 205.

#### FOR R

311 Soils and Land Use (3) W Cole

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 landplanning decisions. Prerequisite, permission.

#### FOR R

#### 320 Forest Ecology (5) ASpS 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 successional dynamics of forest communities, productivity of forests; and applications of forest ecology. Lectures and field exercises. Prerequisite, 10 credits in biology or permission.

#### FOR R

#### 322 Silvicultural Methods (3) Sp Scott

The theory and technique of applying silvical knowledge in controlling establishment, composition, and growth of forest stands. Includes reproduction methods and intermediate cuttings. Prerequisites, 320, 360.

#### FOR R

323 Forest Biology I (3) A

Gara, Wooldridge

Systematics, genetics, evolution, and identification of forest trees as related to structure and environment.

#### FOR R

324 Forest Biology II (3) W

Gara, Wooldridge Consideration of environmental parameters and specific forest ecology, after an initial exposure to plant ecology and physiology.

#### FOR R 326 Range Ecology (5) SpS

### Driver

Interrelations of plants, animals, and men on range-lands. History of rangeland use. One Saturday, field trip required. Prerequisite, permission.

#### FOR R

329 Microclimatology (3) Sp 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 the Department of Atmospheric Sciences as Atmospheric Sciences 329. Prerequisite, Atmospheric Sciences 101 or 201 or permission.

#### FOR R

#### 331 Introductory Forest Pathólogy (4) W Driver

Study of typical forest diseases stressing significance of forest ecology on disease occurrence and control. Prerequisites, 310, 320, Botany 220.

#### FOR R

#### 333 Forest Protection (3) WS

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 R

335 Forest Entomology (3) Sp Gara

Introduction to general entomology, characteristics, life histories, ecological relations, prevention, and control of forest insects. Prerequisite, permission.

#### FOR R

#### 336 Laboratory in Forest Entomology (1) Sp Gara

Introduction to the insect orders; identification of forest insects and their damage. One field trip to study insect problems required. Prerequisite, 335, which may be taken concurrently.

#### FOR R

340 Forest Surveying (3) ASp

Schaeffer

Basic elements of forest surveying. Emphasis on plane surveying techniques, as related to forest areas.

#### FOR R

341 Timber Harvesting (4) Sp

Stenzel Timber harvesting methods and planning procedures. Logging cost and production control. Environmental considerations as related to logging and road construction. Prerequisites, 320, 340, 360.

#### FOR R

#### 350 Field Studies in Outdoor Recreation (3) A

### Sharpe

Studies of outdoor recreation in action. An introduction to the problems of managing large recreation complexes or private, county, state, or federal lands during the period of maximum visitor use. Field trips. Prerequisites, outdoor recreation major and permission.

#### FOR R

## 351 Introduction to Outdoor Recreation (5) A Sharpe

History and philosophy of outdoor recreation development as it pertains to the natural environment. A survey of visitor needs and preferences, trends in use, and objectives of outdoor recreation in a modern society. Emphasis on county, state; and national levels. One field trip.

### FOR R

#### 353 Principles of Natural History Interpretation (3) W

Sharpe

Consideration of the interpretive specialist in outdoor recreation. Increasing visitor enjoyment and manipulating visitor impact through interpretation. Special emphasis on promoting visitor interest and an ecological understanding through information progress. Prerequisite, permission.

#### FOR R

#### 354 Introduction to Management of Recreation Areas (3) A

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. Prerequisite, permission.

#### FOR R

#### 355 Introduction to Planning and Design of Recreation Areas (3) Sp Bradley

The physical planning process in resourceoriented recreation and urban development. Relates both the general influences of sun, climate, access, and urban proximity with specific site influences of topography, vegetation, soil, and water in recreation design. The laboratory includes graphic methods of communication and field trips.

#### FOR R

#### 360 Forest Measurements (5) W. Turnbull

Evaluation of information needs for decision making by forest manager. Study of geometry, sampling design, and estimation processes applied to forestry. Measuring instruments and procedures. Inventory management. Laboratory and field exercises to study contents and growth of tree and forest stand.

#### FOR R

#### 361 Field Studies in Forest Mensuration (3) S Atkinson

Study of sampling and estimating procedures applied to forestry. Use of measuring instruments and field applications, including individual tree measurement, log scaling, timber cruising, and forest inventory techniques. Intended to complement 360 for students who wish to increase their field skills. Prerequisite, 360 or permission.

#### FOR R

#### 362 Aerial Photos in Forestry (3) ASp

Photo interpretation and photogrammetry with applications to forest and land management. Uses of panchromatic, infrared, color, and false color photos; remote sensing. Simple map making. Prerequisite, permission.

### FOREST RESOURCES

#### FOR R

365 Forest Resources Management I (5) ASp 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 decisionmaking framework to provide a basis for the efficient allocation of forest and land resources. (Formerly 460.)

### FOR R

374 Wood Utilization (3) A

Bryant Nature of wood products industry; processing; demand and specifications for raw material and end products.

### FOR R

375 Wood Utilization Laboratory (2) W Bryant

Familiarization with the processing and economic environment of the forest products industries through field studies in local plants. Emphasis on small-log utilization in general and on the lumber industry in particular.

#### FOR R

377 Elements of Timber Design (4) A Bryant

Mechanical properties of wood, beam theory, and structural engineering concepts, beam design, force systems, and design of simple wood structures.

#### FOR R

400 Wood and Fiber Structure (5) A Leney

Woody plants. Growth of the tree stem. Development of the woody cell and the structure of coniferous woods including fiber characteristics. Structure of hardwoods, including fibery relationship of wood structure to its total physical properties. Natural defects in wood and fiber. Prerequisite, Biology 110 or equivalent.

#### FOR R

#### 401 The Physics of Wood and Fiber Composites (4) W

Jayne

Equilibrium physical properties of composite systems. Structure and models, mass density, equilibrium moisture properties and equilibrium thermal properties. Stress, strain, Hooke's law for orthotropic materials. Electrical polarization, axial and bending stress, dielectric heating. Prerequisites, Mathematics 126, Physics 116.

#### FOR R

402 The Physics of Wood and Fiber Composites (4) Sp

Jayne

Equilibrium properties, mass and energy transport, time-dependent electrical behavior, inelastic behavior and vibration. Prerequisite, 401. (Offered alternate years; offered 1975-76.)

#### FOR R

403 Fibrous Structure and Rheology I (3) W Allan

Review of the synthetic and natural fibers and their chemical, physical, microscopic, and submicroscopic properties. The bonding behavior of fibers in networks. Analysis of the structure of fiber networks with reference to nonwovens and paper.

#### FOR R

#### 404 Fibrous Structure and Rheology II (3) Sp Allan

Behavior of fibers in fluid suspensions and

properties of webs formed therefrom. Physics and chemistry of fiber-polymer interactions and adhesion. Fiber modification by physical and chemical processes and theory and design of fiber composite materials. Prerequisite, 403. (Offered alternate years; offered 1974-75.)

#### FOR R

405 Microtechnique (3) W

Leney The technique of preparing, sectioning, staining, and mounting woody tissues and fibers for microscopic study. Prerequisite, permission.

#### FOR R

406 Wood Chemistry I (3) A

Sarkanen Chemical and physical properties of cellulose, lignin, hemicellulose, and extractives. Wood as a raw material for the chemical industry. Prerequisite, Chemistry 102 or equivalent.

### FOR R

#### 407 Wood Chemistry I Laboratory (2) W Sarkanen

Laboratory to supplement 406.

#### FOR R

408 Wood Chemistry II (3) W Sarkanen

Review of the chemistry of conversion of wood to pulp, paper, and by-products. Prerequisite, 406.

#### FOR R

#### 409 Wood Extractives Chemistry (2) Sp Hrutfiord

The nature, origin, and occurrence of the extraneous components of wood, their influence on pulp and paper preparation, and their utilization.

### FOR R

#### 411 Soil and the Forest Ecosystem (3) Sp Cole

Study of soil in the field with emphasis on measurement of properites. Relationship of soils to forest vegetation. Prerequisite, 310.

### FOR R

412 Soil Genesis (4) W

Ugolini

Soil, the excited skin of the earth. Processes of soil formation and weathering distribution of major soils in the world.

#### FOR R

#### 413 The Geography of Soli (4) Sp Ugolini

Study of the distribution and morphology of soils in relation to environmental factors. Lectures and field trips to illustrate the properties and the processes of the soils throughout the unique terrestrial ecosystems of the state of Washington.

#### FOR R

#### 415 Applied Forest Hydrology (4) A Wooldridge

Study of fundamental aspects of hydrology as influenced by silvicultural and timber harvest methods. Includes soil erosion, water quality, and manipulation of the forest stands for altered water yield. Prerequisite, senior standing or permission.

#### FOR R

#### 416 Micrometeorological Measurements and Instrumentation (5) W Fritschen

Principles and theories of biometeorological instrumentation. Accuracy, measuring solar

and thermal radiation, heat flux, air and soil temperature, atmospheric moisture content, wind. Prerequisites, Mathematics 126, Physics 123, or permission.

#### FOR R

#### 421 Dendroecology (4) Sp Brubaker

Analysis of important physiological and environmental factors controlling annual treering growth and a critical review of the applications of tree-ring analysis to study forest productivity, watershed hydrology, forest fires, insect epidemics, etc., in relation to yearly weather conditions. Laboratory and field exercises construct tree-ring chronologies to study environmental histories of selected forest stands. Prerequisites, introductory botany and senior or graduate standing.

#### FOR R

#### 422 Forest Regeneration Operations (3) WS Kenady

Procedures and problems of regenerating forest lands, including cone collection and processing, seed processing and treatment, seed orchard and nursery management, and field techniques for establishing forest plantations. Three field trips required. Prerequisite, major in forest resources.

#### FOR R

#### 423 Advanced Forest Ecology (3) AW Scott

For students with some previous training in ecology. Discussion centered around primary processes and growth, patterns in forest tree species, and forest community dynamics and productivity as affected by environment. Several one- to three-day trips throughout the Pacific Northwest. Prerequisite, permission.

#### FOR R

#### 424 Selected Topics in Silviculture (3) AW Scott

Detailed discussion of special problems or subjects in silviculture of interest to advanced students. Prerequisite, permission.

#### FOR R

**425** Introduction to Population Biology (4) Sp Applications of elementary mathematical methods, including digital computer techniques, to population and community ecology. Subject matter includes topics from population genetics, population dynamics, and community and ecosystem dynamics. Prerequisites, 300, 320, Quantitative Science 292, or permission.

#### FOR R

#### 427 Forest Genetics (3) W

Stettler

Genetic theory as applied to the biological manipulation of forest trees. Principles of genetics and organic evolution are discussed and related to management strategy and silvicultural practice. Prerequisite, 300 or permission.

#### FOR R

#### 430 Elementary Forest Fire Science and Technology (3) W Schaeffer

Forest fire behavior; fire and ecology; organization and management of forest fire control systems; economics of fire control; use of fire in forest land management. Meteorological and thermophysical bases for forest fire behavior.

#### FOR R

#### 433 Biology of Forest Diseases (5) W Driver

Detailed studies on the biology of host-

pathogen relationships exhibited by certain forest diseases. Prerequisite, 331. (Offered alternate years; offered 1975-76.)

#### FOR R

#### 436 Ecology of Forest Insects (4) W 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 1975-76.)

### FOR R

440 Construction (4) W Stenzel

Design and construction of forest roads; earthmoving methods and costs, explosives, surfacing, drainage facilities. Laboratory: design of timber bridges. Prerequisite, 377 or permission.

#### FOR R

#### 441 Forest Engineering (5) A Stenzel

Planning the logging operation: logging methods, route projection, selection of landings and settings, logging cost control. Prerequisite, CETC 310.

#### FOR R

#### 442 Financial Analysis of Logging Equipment and Operations (4) W Dowdle

Business investment management in logging industry with particular emphasis on equipment replacement. Engineering performance of various types of logging equipment. Individual student project includes some field work. Prerequisite, 441 or permission.

#### FOR R

#### 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 or permission.

#### FOR R

#### 446, 447, 448, 449 Senior Forest Engineering Field Studies (2,5,5,3) Sp,Sp,Sp,Sp Atkinson, Stenzel

446: route projection and logging planning. 447: reconnaissance and preliminary surveys. 448: road location and construction surveys. 449: cost estimates and reports. Development of a complete logging plan for a timber tract. Courses given consecutively in Spring Quarter. Prerequisite, 441.

#### FOR R

#### 451 Outdoor Recreation Economics (3) Sp Waggener

The application of economic principles to 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, Economics 200.

#### FOR R

#### 452 Sociology of Leisure and Outdoor Recreation (3) W

Field .

Focuses upon an understanding of human behavior in leisure settings. An examination of basic sociological concepts as well as 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, Sociology 110.

#### FOR R

#### 453 Advanced Natural History Interpretation (5) Sp

Sharpe Independent study projects dealing with the interpretation of physical and natural phenomena for the enjoyment of recreational visitors. Practical experience in the design and the use of interpretative materials for better understanding of the outdoor recreation activity. Prerequisite, 353 or permission.

#### FOR R

#### 455 Advanced Planning and Design of Outdoor Recreation Areas (5) A Bradley

Independent study projects in the planning and the design of outdoor recreation areas and facilities. Integrated consideration of the resource base, social factors, and management objectives in recreation area planning. Selected case studies in area planning and design. Prerequisite, 355.

#### FOR R

#### 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, problems, trends in use, issues and controversies, wilderness research, social costs, and benefits of wilderness. Prerequisite, permission.

### FOR R

#### 459 Case Studies in Outdoor Recreation (5) Sp

### Bradley

Investigation of the problems, the policies, and the procedures of selected public and private lands used for outdoor recreation, using the comprehensive master planning approach. Extensive field trips. Prerequisites, 351, 353, 354, 355.

#### FOR R

#### 461 Advanced Forest Mensuration (3) W Turnbull

Forest tree and stand models. Studies of forest tree and stand parameters. Estimation processes. Growth and yield analysis. Prerequisite, 360, Mathematics 281, or permission.

#### FOR R

463 Contemporary Problems in Forest Land Use (3) W Dowdle, Waggener

Current conflicts among competing uses for forest land; trends in forest land use; impact of public policy on growth and development of forest products industries. Prerequisite, permission.

#### FOR R

#### 464 Economics of the Forest Products Industries (3) W Waggener

Market structure of major forest-related industries. Changing pattern of forest land use and impact on forest industries. Economic factors affecting distribution and marketing of forest products, including international, interregional, and intraregional competiton. Prerequisite, Economics 200.

#### FOR R

#### 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 R

#### 466 Economics of Timber Production (3) Sp Schreuder, Waggener

Application of basic economic concepts to the production of timber as a commerical land use. Analysis of timber investments, alternative management programs, and regulation models.

#### FOR R

#### 468 Forest Resources Management II (5) W Atkinson, Bare

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. Prerequisite, 365.

#### FOR R

#### 469 Forest Resources Management III (5) Sp Bare, Schreuder

Application of biological, financial, and operations research principles to formulation and solution of short-term 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 R

#### 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 R

#### 472 Plywood and Laminating Processes (3) W Bryant

Theory of wood adhesion, chemical nature of wood adhesives, requirements of an adhesive relative to important wood and process variables. Prerequisite, senior standing in Wood and Paper Divison or permission.

#### FOR R

#### 473 Gluing Process Technology (4) Sp Bryant

Gluing technology as it relates to the important variables that affect the properties of plywood, particle board, hardboard, insulation board, and lumber laminates. Prerequisite, 472.

#### FOR R

#### 475 Wood Drying Technology (3) Sp 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 standing in Wood and Paper Division or permission.

### FOREST RESOURCES

#### FOR R

476 Pulp and Paper Technology (3) W Gardner.

Chemical and technological aspects of the manufacture of mechanical and chemical pulps and of paper and paper products. Prerequisite, Chemistry 102 or 232 or permission.

#### FOR R

#### 477 Pulp and Paper Laboratory (2) Sp Gardner

Laboratory experiments in the pulping of wood, fiber technology, and physical and chemical characteristics of paper and pulp. Prerequisite, 476.

#### FOR R

#### 479 Analysis of Wood Processing Facilities (3) A

Bethel

Application of wood science and technology to analysis of the effectiveness of wood processing facilities. Production control and quality control related to materials and processes. Procurement control problems. Decision making with respect to product mix, equipment modification, analysis of inventory control, and material movement.

#### FOR R

### 480 Wood Process Development and Design (3) W Bethel

Study of the factors influencing feasibility judgments with respect to industrial development and factory design. Feasibility of new forest products manufacturing installations with reference to raw material supply, markets, transportation, and labor supply. Analysis of case histories of forest products manufacturing and facility development. Use of operations research methods in feasibility studies. Prerequisite, permission.

#### FOR R

#### 481 Pulp and Paper Unit Operations (4) Sp Gardner

Unit operations of particular interest in the pulp and paper industry in addition to those covered in Chemical Engineering 340 and 435. Prerequisite, Chemical Engineering 435.

#### FOR R

#### 485 Undergraduate Research (1-3, max. 3), AWSp

Undergraduate research or independent study project under the supervision of the faculty; usually one credit per quarter. Prerequisite, senior standing in Wood and Paper Division.

#### FOR R

#### 487 Introduction to Wood Biochemistry (3) A Hrutfiord

Basic biochemical concepts; emphasis on the chemistry of photosynthesis, plant metabolism, and protein biosynthesis. (Offered alternate years; offered 1974-75.)

#### FOR R

#### 488 Polymer Chemistry (3) Sp Alian

Fundamental review of synthetic and natural polymers, including kinetics of formation, molecular weight distributions, and solid-state and solution properties.

#### FOR R

### 489 Wood Biosynthesis (3) W

Hrutfiord

Biosynthesis of carbohydrates, phenolic and terperoid compounds in forest trees, and biochemistry of wood degradation. Prerequisite, 487 or Biochemistry 405.

### FOR R

#### 490, 491, 492 Undergraduate Studies (1-5,1-5,1-5)

Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. The courses are offered in all quarters, and credits can vary from 1 to 5, and, with the permission of the instructor, each course may be repeated for credit. Credits are individually arranged for each course. Prerequisite, permission.

#### FOR R

493 Ecology of the Northwest I (2) W Gara, Ugolini

Interdisciplinary seminar series. Topics of discussion emphasize the environmental history of the Pacific Northwest; ecological relationships associated with present-day environmental conditions; interaction of past and present social systems; and aspects of resource management.

#### FOR R

## 494 Ecology of the Northwest II (2) Sp Gara, Ugolini

Interdisciplinary seminar series. Topics of discussion emphasize the environmental history of the Pacific Northwest; ecological relationships associated with present-day environmental conditions; interaction of past and present social systems; and aspects of resource management.

#### **Courses for Graduates Only**

#### FOR R

500 Graduate Seminar (2) A Gara, Gessel

Discussion of current issues and problems in forestry and forestry research.

#### FOR R

#### 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 R

#### 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 R

#### 511 Forest Soils Seminar (2) W Gessel

Discussion of current topics in forest soils research and management. Prerequisite, permission.

#### FOR R

512 Soil Chemistry (4) W Ugolini

Topics in soil chemistry and physical chemistry: organic fraction, exchangeable process, clay mineralogy, and short range order minerals.

#### FOR R

#### 513 Soil Formation and Classification (3) Sp Gessel

Study of soil-forming factors and processes, and principles of soil classification. Distribution of soils. Prerequisite, 310.

#### FOR R

#### 514 Forest Influences (4) Sp Wooldridge

Study of the interacting effects of climate, soil, and plants as a basis for understanding the hydrologic cycle. Places special emphasis on disposition and movement of water in forest ecosystems. Prerequisite, graduate standing or permission.

#### FOR R

#### 517 Soil Plant-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, Mathematics 126, Physics 123, Atmospheric Sciences 329. (Offered alternate years; offered 1975-76.)

#### FOR R

#### 521 Current Problems in Forest Ecology (3) W

Scott

Consideration of current literature and topics in forest ecology and tree physiology. Prerequisite, permission.

#### FOR R

#### 522 Current Problems in Silviculture (3) Sp Scott

Detailed study of the literature dealing with recent applications of silviculture in world forestry. Prerequisite, permission.

#### FOR R

#### 524 Tropical Forests (3) Sp Bethel

Comparative study of the forests of temperate and tropical regions. Diversity in tropical ecosystems. Comparisons among tropical forest biomes. The structure and properties of tropical forest trees and woods. Problems in the utilization of tropical woods basic to the development of tropical forestry management practice. Forest land use practices and problems in the tropical regions of the world. Prerequisite, permission.

#### FOR R

#### 527 Advanced Forest Genetics (3) W Stettler

Discussion course relating concepts of quantitative and population genetics to forest-tree populations, both natural and artificial. Prerequisite, Genetics 451, or equivalent. (Offered alternate years; offered 1974-75.)

#### FOR R

## 531 Forest Fire Science Seminar (2) W

Presentation and discussion of current issues in forest fire prevention, control, use, and discussion of ongoing fire research. Prerequisite, permission.

#### FOR R

#### 532 Planning, Management, and Analysis of Forest Fire Control Systems (3) Sp Martin

The forest fire control 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, Administrative Theory and Organizational Behavior 550, Quantitative Methods 510.

#### FOR R

#### 533 Investigations of Forest Diseases (5) W Driver

Studies on concepts and experimental proce-dures used in forest microbiological research. Prerequisites, 433 and permission. (Offered al-ternate years; offered 1974-75.)

#### FOR R

537 Forest Fire Behavior (3) W Martin

Basic combustion and heat transfer processes related to behavior of free burning fires. Forest fuels. Effect of fuel, weather, and topography on the spread, intensity, and difficulty of control of forest fires. Prediction of fire behavior. Prerequisites, 329, 538, Atmospheric Sciences 310.

#### FOR R

#### 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, Mathematics 105, Physics 114, 115.

#### FOR R

#### 541 Advanced Forest Engineering (5) AW Stenzel

Logging organization and management; logging cost analysis and budgeting. Prerequisite, permission.

#### FOR R

#### 542 Advanced Logging Engineering (3) W Stenzel

Detailed consideration of problems of logging planning and truck road engineering, includ-ing the preparation and field layout of logging plans; location, design, and construction of logging truck roads. Prerequisite, permission.

#### FOR R

#### 551 Current Problems in Recreational Management of Wildlands (3) Sp Sharpe

examination, and discussion Investigation. of current problems of recreational management of wild lands. Prerequisite, graduate standing.

#### FOR R

#### 552 Outdoor Recreation Research Methods (3) W

Wagar

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 R

#### 557 Topics in Forest Zoology (3) W Weisfrod

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. Prerequisite, permission.

#### FOR R

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 R

### 562 Advanced Forest Resources Management (3) A Bare

Application of techniques of management science and financial management to planning and control of forest production processes. Emphasis on the design of information systems, the optimal allocation of resources over time, the construction and experimentation with total system simulators, and the application and evaluation of selected financial control techniques. Prerequisites, 460, and Quantitative Science 396 and 496. (Offered alternate years; offered 1974-75.)

#### FOR R

#### 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, permission.

#### FOR R

#### Society, Man, and Natural Resources 567 (3) W

Field

Exploratory examination of the interrelationships between man and natural resources. Application of sociological concepts and theories for understanding natural resource utilization and conservation is a common thread throughout the course. The importance of social structures, social groups, culture, and norms as factors affecting the ultimate resolution of natural resource issues is emphasized. Prerequisites, Sociology 110 and permission.

#### FOR R

#### 571 Advanced Wood Preservation (3) W Erickson

Permeability of wood, theory and factors affecting penetration, liquid movement in wood, chemical effects on wood. Prerequisite, permission.

#### FOR R

#### 572 Wood Chemistry and Analysis (3-5) Sp Hrutfiord

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, permission. (Offered alternate years; offered 1975-76.)

#### FOR R

Wood-Moisture Relations (3) W 573 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 diffu-sion in wood. Prerequisite, permission.

#### FOR R

Wood-Resin Relations (3) Sp 574 Bryant

Technology of synthetic resins as wood

adhesives, wood impregnants, binders, overlays, and surface coatings. Prerequisite, permission.

#### FOR R

#### 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, permission.

#### FOR R

#### 576 Photomicrography of Woody Tissues (3) Sp

Leney

Theory and method in microscopy and photomicrography of woody tissues. Prerequisite, nermission.

#### FOR R

#### Wood and Paper Science Seminar (1) 577 AWSp

Discussion of current topics in the science of wood and its various composites in the form of composition board, laminates, and paper. Prerequisite, permission.

#### FOR R

#### 578 Environmental Protection in the Pulp and Paper Industry (2) Sp Hrutfiord

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 the Department of Chemical Engineering as Chemical Engineering 578. Prerequisites, 406, 476, or permission. Available to seniors. (Offered al-ternate years; offered 1975-76.)

#### FOR R

579 Forestry and Wood Utilization in the Economic and Social Environment (2) Sp **Bryant** 

For graduate students in the College of Forest Resources with baccalaureate or master's degrees outside of the forestry field (e.g., biology, chemistry, engineering). World view of the interrelationships of forestry and wood utilization in the economic and social environment, as well as an opportunity to relate research interests to this framework. Prerequisite, permission for other graduate students.

#### FOR R

#### 590 Graduate Studies (1-5)

Study in fields for which there is not sufficient demand to warrant the organization of regular courses. Prerequisite, permission.

#### FOR R

600 Independent Study or Research (\*)

FOR R 700 Master's Thesis (\*)

#### FOR R

800 Doctoral Dissertation (\*)

#### TUTORIAL STUDY

Tutorial study designed to meet individual re-quirements 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

### INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

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 R

510 Graduate Studies in Forest Soils (1-5) Cole, Gessel, Ugolini

#### FOR R

515 Graduate Studies in Forest Influences (1-5) Fritschen, Wooldridge

#### FOR R

516- Graduate Studies in Forest Meteorology (1-5) Fritschen

- FOR R
- Graduate Studies in Forest Ecology and 520 Silviculture (1-5) Scott

#### FOR R

526 Graduate Studies in Forest Genetics (1-5) Hatheway, Stettler

#### FOR R

530 Graduate Studies in Forest Fire Control (1-5) Martin, Schaeffer

#### FOR R

534 Graduate Studies in Forest Pathology (1-5) Driver

#### FOR R

535 Graduate Studies in Forest Entomology (1-5) Gara

#### FOR R

Graduate Studies in Logging Engineering 540 (1-5) Atkinson, Stenzel

FOR R

Graduate Studies in Forest Recreation 550 (1-5)

Field, Hendee, Sharpe, Wagar

FOR R . 555 **Graduate Studies in Wildlife** Management (1-5) Manuwal, Taber

### FOR R

556 Graduate Studies in Forest Zoology (1-5) Weisbrod.

#### FOR R

**Graduate Studies in Forest Resource** 559 Planning (1-5) Bradley

#### FORR

560 Graduate Studies in Forest History and Policy (1-5) Dowdle, Waggener

### FOR R

563 Graduate Studies in Forest Mensuration (1-5) Turnbull

#### FOR R

565 Graduate Studies in Forest Management (1-5) Bare, Schreuder, Waggener

FOR R

566 Graduate Studies in Forest Photogrammetry (1-5) Schreuder

#### FOR R

568 Graduate Studies in Forest Economics (1-5) Dowdle, Waggener

### FOR R

Thomas

**Graduate Studies in Forest Products** 570 (1-5) Allan, Bryant, Erickson, Gardner, Hrutfiord, Jayne, Leney, Sarkanen,

## INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

These programs are administered by interdisciplinary groups of the Graduate School. Certain courses carrying the particular program prefix appear below; other courses with the same prefix appear elsewhere as indicated. Other courses included in these programs are selected from many disciplines throughout the University and carry the prefix of the respective discipline.

#### **ART HISTORY**

ART H

600 Independent Study or Research (\*)

ART H 800 Doctoral Dissertation (\*)

### **BIOLOGY TEACHING**

No courses have this program prefix; all courses included in this interdisciplinary program appear under the appropriate discipline headings.

#### BIOMATHEMATICS

#### 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. Pre-requisites, 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**

#### Special Topics in Quantitative Ecology (1-3, max. 12) AWSp 598

Special topics in quantitative ecology, including population and community-ecology, systems ecology, and physical processes in ecosystems.

#### BMATH

599 Research in Quantitative Ecology (1-5, max. 5) AWSp Gallucci, Hatheway, Jayne

Special advanced topics in quantitative ecology. Topics can be of a theoretical nature or combined theory and experiment. Prerequisite, permission.

#### BMATH

600 Independent Study or Research (\*)

BMATH 700 Master's Thesis (\*)

BMATH 800 Doctoral Dissertation (\*)

#### **COMPARATIVE LITERATURE**

### **C**LIT

600 Independent Study or Research (\*)

CLIT 700 Master's Thesis (\*)

CLIT 800 Doctoral Dissertation (\*)

#### **COMPUTER SCIENCE**

#### C SCI

470 Design of Digital Data Systems (4) AW Fundamental gating circuits are developed into large logic gating structures. The use of these structures in the design of central processing units, memories, and peripheral equipment is illustrated. Course for majors in computer science. Prerequisite, permission.

#### C SCI

#### 472 Computer Software Systems (3) W

Principles of operating systems, compilers, assemblers, interpreters, and loaders for digital computers. Not intended for graduate students in computer science or electrical engineering with emphasis on advanced programming. Not open to students who have taken Electrical Engineering 501 or 502. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 472. Prerequisite, 478.

#### C SCI

#### 478 Computer Organization and Machine Language Programming (4) ASp

Differences and similarities in computer structure. Flow of control. Instruction codes and their execution for arithmetic, logical, character manipulation, and input-output operations. Indexing and indirect addressing; subroutine linkage. Study of information representations and their relationship to processing techniques. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 478. Prerequisites, Engineering 141 and 315, or equivalent.

#### C SCI

#### Computers and Society (2) W 500 Gillespie, Shaw

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) A

Basic concepts and design of interpreters and storage management, and code generation for general-purpose languages. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 501. Prerequisites, 478 and working knowledge of a block-structured programming language.

#### C SCI

#### 502 Compiler Construction II (3) W

Advanced topics in compiler construction. Translator writing systems, incremental compilation, compiler-interpreters. Practical considerations for production compilers. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 502. Prerequisite, 501.

#### CSCI

#### **Comparative Study of Programming** 504 Languages (3) Sp

Important programming languages from various traditions are studied and compared so that major contributions of each language can be understood. Possible languages for study include TRAC, LISP 1.5, ALGOL 60, PASCAL, SIMULA 67, SNOBOL 4, and APL. Prerequisite, 478.

#### C SCI

#### 505 Concepts of Programming Languages (3) W Herriot

Programming language semantics define virtual machines that serve as interfaces between man (programmers) and actual machines (computers). Methods of defining virtual machines (semantic modeling) and concepts of virtual machines are examined. Such concepts include: data structures (arrays, records, etc.), operators on data structures, the assignment operator, references, typing, environments and binding of identifiers to values, functions, and labels and their relationship to environments. Examples from existing programming languages are given. Prerequisite, 478.

#### C SCI

#### **Representation and Handling of Data** 508 Structures (3) A

Linear lists (stacks, queues, deques): sequential and linked allocation. Circular and doubly linked lists. Trees, binary trees and threaded lists: traversal algorithms-analysis of flow charts—path length of trees. Garbage collec-tion. Dynamic storage allocation. Transferring algorithms. Data management on external media. Prerequisite, 478 or permission.'

#### C SCI

#### 510 List Processing and String Manipulation (3) W

Structure of information sets that reflect the syntactic or semantic relationships in the information. The generation and processing of structures such as lists and trees. Generalized information systems. Pattern recognition and manipulation of symbolic strings. Markov algorithms. Algebraic symbol-manipulation processes. Syntax, semantics, and use of recent versions of languages such as LISP, FOR-MULA-ALGOL, SNOBAL, and FORMAC. Prerequisite, 508 or permission.

## INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

#### C SCI

#### 518 Digital Signal Processing (4) Sp

Signal classification and representation; data collection, processing and display. Emphasis on the derivation, evaluation, and application of various information-extraction algorithms and their realization on a digital computer. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 518. Prerequisite, graduate standing or permission.

#### C SCI

### 520 Computer Science Seminar (0) AWSp

Weekly discussion by students and faculty or visitors on topics of current interest. Must be taken by all graduate students for three quarters.

#### C SCI

#### 531 Automata Theory I (3) W

Phrase-structure grammars. Relation between grammars and automata. Deterministic and nondeterministic finite state automata, push-down store automata, linear-bounded automata, and Turing machines.

#### C SCI

### 532 Automata Theory II (3) Sp

Continuation of 531. Selected topics from closure properties of languages, time and tape bounded Turing machines, deterministic pushdown automata, LR(k) grammars, decision problems, abstract complexity theory, and other topics in automata theory. Prerequisite, 531.

#### C SCI

#### 537, 538 Computability Theory (3,3) Introduction to the theory of effective computa-

bility. Formulation of the concepts of recursive and partial recursive function and recursively enumerable set. Study of the relationship be-tween a program and the properties of the function compute by that program. Introduction to reducibility procedures, construction of undecidable problems, degrees of unsolvability, recursive invarience, and isomorphism. Classification of unsolvable problems, the arithmetical hierarchy, the relation of the degree of unsolvability of a set to the logical complexity required to describe the set. Connection with mathematical logic, the theorems of Godel, Church, and Tarski. As time permits, introduction of various related topics in computational complexity. Prerequisite, Mathematics 502, or permission.

#### C SCI

#### 540 Discrete System Simulation (3) W Noe

Principles of simulation of discrete, eventoriented systems. Model construction, simulation, and validation, and relationship to other techniques for system analysis and design. Use of special-purpose simulation languages such as SIMSCRIPT and SIMULA, and study of their functional components and data structures, with examination of the equivalent tasks necessary to use general-purpose languages for simulation. Prerequisite, knowledge of ALGOL.

#### C SCI

#### 541 Computer Measurements and Evaluation Techniques (3) Sp

Viewpoints, problems, and techniques in assessment of computer systems and subsystems. Selection of models, analysis, simulation, and instrumentation, with problem assignments making use of computers available on campus. Prerequisite, 540 or permission.

#### C SCI

### 542 Central Processor Architecture (3) W Several central processing units are examined at the gate level. Included are the logic struc-

tures of: I/O bus, memory bus, ALU, address modification, control logic, combinatorial and multiphase instructions, access priority, cycle stealing, etc. Prerequisite, 470.

548 Computer Systems Architecture (3) W Notations for describing computer systems. Powerful CPUs. Memory organization. Chan-nels and I/O processors. Microprogramming. Stack computers. Array and pipeline proc-essors. Prerequisite, 478, 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

#### 552 Systems Programming Practicum (3-5, max. 12) WSp

Practical experience in the design and implementation of computer software (e.g., language processors, operating systems, graphics system). Students work in groups under the supervision of a faculty member for several quarters, typically using the equipment in the Computer Science Teaching Laboratory. Sem-. inars on the concepts of systems design and software engineering are part of the laboratory work. Projects may be proposed by groups of students or by a faculty member. Offered on credit/no credit basis only. Prerequisite, permission.

#### C SCI

#### 557 Computer Graphics (3) Sp

Generation, analysis, and interpretation of pictures by computer with or without human interaction. Graphics hardware. Computer representations of pictures: low-level encodings. structured descriptions. Preprocessing and pattern recognition. Linguistic methods in picture processing: description by strings and graphs; grammars; parsing techniques. Picture transformations, affine transformations, projective geometry, homogeneous coordinates. Hidden line and surface problems. Programming languages and systems for interactive graphics. Each student is required to complete a project on the interactive graphics facility of the Computer Science Teaching Laboratory. Prerequisite, 508.

#### 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.

### INTERSCHOOL OR INTERCOLLEGE PROGRAMS

C SCI

590 Special Topics in Computer Science (\*) AWSp

Lectures and discussions of current interest in computer science. May be repeated for credit. Prerequisite, permission (May not be offered every quarter; content may vary from one offering to another.)

#### C SCI

600 Independent Study or Research (\*) AWSpS

#### C SCI

700 Master's Thèsis (\*) AWSpS

C SCI 800 Doctoral Dissertation (\*) AWSpS

### DRAMA ARTS

D ART 800 Doctoral Dissertation (\*)

#### EAST ASIAN STUDIES

See also Institute for Comparative and Foreign Area Studies.

#### EASIA

600 Independent Study or Research (\*) AWSp

EASIA 700 Master's Thesis (\*) AWSp

#### **INDIVIDUAL PH.D. PROGRAM**

#### 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 Chairman. 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) History of climatic changes during the Quaternary Period, as revealed by physical and biological data. Global chronology and correlation of quaternary sediments. Prerequisite, senior standing or permission. (Not offered 1974-75.)

#### QUAT

501 Seminar in Quaternary Environments (2, max. 8) W

Interdisciplinary seminar in the changing natural environments of the Quaternary Period, with emphasis on climatic changes and their effects. (Last time offered: Spring Quarter 1975.)

#### QUAT

502 Interdisciplinary Quaternary Investigations (3-5, max. 15)

Research course for interdisciplinary investigations of Quaternary problems. Problemoriented case study required if taken in conjunction with 501. (Last time offered: Spring Quarter 1975.)

#### QUAT

#### 513 Quaternary Stratigraphy of the Western Hemisphere (3) Sp Porter

Quaternary stratigraphy of North and South America, Antarctica, and Greenland. Emphasis on glacial record of North America and on nonglacial record of selected areas throughout the hemisphere. Offered alternate years jointly with the Department of Geological Sciences 513. (Last time offered: Spring Quarter 1975.)

#### 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 the Department of Geological Sciences as Geological Sciences 514. (Last time offered: Spring Quarter 1978.)

#### RADIOLOGICAL SCIENCE

#### RAD S

520 Radiological Science Seminar (1, max. 6)

#### RAD S

600 Independent Study or Research (\*) AWSpS

RAD S

700 Master's Thesis (\*) AWSpS

### RUSSIAN AND EAST EUROPEAN STUDIES

See also Institute for Comparative and Foreign Area Studies.

REEU

600 Independent Study or Research (\*) AWSp

REEU 700 Master's Thesis (\*) AWSp

### INTERSCHOOL OR INTERCOLLEGE PROGRAMS

#### BIOENGINEERING

Administered by the School of Medicine and the College of Engineering.

#### BIOEN

299 Introduction to Bioengineering (1) ASp Lectures, discussions, and reading assignments on the various aspects of bioengineering; orientation in bioengineering studies and practice.

#### BIOEN

#### 402 Essentials of Bioengineering II (3) W Huntsman, Rushmer

Coverage includes principles of measurements and materials, followed by case studies of engineering in the musculoskeletal, cardiovascular, and respiratory systems. Prerequisite, Physiology and Biophysics 360.

#### BIOEN

#### 403 Essentials of Bioengineering III (3) Sp Holloway, Moritz

Coverage includes case studies of engineering in the renal system, digestive system, skin, eyes and ears, and reproductive system; computer applications in bioengineering also are covered, and the course finishes with consideration of engineering opportunities in health care and its delivery. Prerequisite, Physiology and Biophysics 360.

#### BIOEN

#### 410 Engineering Prescriptions for Health Care Crises (3) A

Designed to present and discuss current crises in health care with cause or cure related to applications of modern technology. The nature and scope of bioengineering is considered in relation to manpower requirements, health care facilities, distribution of care, 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

#### 460 Wave Effects in Bio-Materials (3) Sp

Ultrasonic, electromagnetic, and optical wave effects in biological materials. Applications to biomedical uses in diagnosis, therapy, and surgery. Prerequisite, Electrical Engineering 381 or other course in wave propagation, as approved by instructor. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 460.

#### BIOEN

#### 470 Engineering Approaches to the Cardiovascular System (3) Sp

Concerned with the engineering techniques and physiological concepts appropriate to a quantitative approach to the cardiovascular system. Current literature is used together with texts, and guest lecturers discuss specialized topics. Prerequisites, senior standing and permission; some previous exposure to physiology recommended.

BIOEN

#### 472 Diagnostic Ultrasound (2-6) 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 Department of Chemical Engineering as Chemical Engineering 490.

#### 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 interest as announced. Prerequisite, permission.

### **INSTITUTE FOR** MARINE STUDIES

#### IMS

471, 472 Scientific Perspectives on the Marine Environment (2,2) A,W

Fleming Descriptions of marine environments and the regional and seasonal variations in their characteristics. Scientific principles and the magnitude of natural processes. Constraints imposed by the environments upon technology and social management. Prerequisites, per-mission; 471 for 472.

#### IMS

499 Undergraduate Research (1-3, max. 6) AWSpS

Research on assigned topics under the supervision of faculty members. Prerequisite, permission. :

#### IMS

#### **General Seminar in Marine Studies** 520 (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 per-spectives. Prerequisite, permission.

#### IMS

Independent Study or Research (\*) 600 AWSoS

### **QUANTITATIVE SCIENCE**

Administered by the College of Fisheries and the College of Forest Resources.

#### **COMPUTER PROGRAMMING**

#### O 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 Fisheries 340 has been taken. Prerequisite, 281 or 381.

#### QUANTITATIVE ECOLOGY

#### O SCI

### 450 Ecological Models (4) Sp

Empirical models; energy flow and compartmental models and their use in ecology; spatial patterns; ecological diversity; other special models. Prerequisite, 456. (Formerly 460.)

#### O SCI

451, 452 Ecosystem Dynamics (3,3) A,W

Unified overview of the physical and biological processes that make up natural and manmanaged ecosystems. Facets of the physical environment-production, consumption, de-composition, 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). Prerequi-sites, 292, 340, 450, or permission for 451; 451 for 452.

#### Q SCI 456

#### **Mathematical Models in Population** Biology (4) A

Definition and role of mathematical models in population biology; types of models; population processes and population growth; use of computer in model building; sampling and other methods of estimation of population parameters. Prerequisites, 281, 292, Fisheries 425 or Biology 210 or permission.

#### Q SCI

#### Management of Exploited Animal 457 Populations (4) W

Equilibrium yield model; spawner-recruit models. management methods; use of catch-effort statistics in estimation and management, computer simulation in management decisions. Prerequisite, 456.

#### PHYSICAL PROCESSES IN **BIOLOGICAL SYSTEMS**

#### **O SCI**

461 Thermodynamics of Life Processes (4) W Thermodynamics of life processes with particu-lar application of the free energy functions to descriptions of life processes. Appli-cations to processes in the atmosphere, dilute solutions, soil systems, and living cells. Introduction to the concepts of entropy in biology. Prerequisites, 291, 292, Biology 210, 211, 212.

#### Q SCI

#### 462 Irreversible Thermodynamics in Biology (4) Sp

Flows and forces in irreversible processes in biological systems. Onsogar's laws. Diffusion and sedimentation. Membrane permeability. Transport in biological systems. Electro-chemical processes. Prerequisites, 461, 493, or equivalent.

#### **OPERATIONS RESEARCH**

#### **Q SCI**

#### 270 Introduction to Operations Research and **Resource Management (4) Sp**

Elementary introduction to systems analysis methodology and selected techniques of management science and their application in natural resource management. Emphasis on the identification, definition, and is structure of management problems. Selected case studies are presented to illustrate applications to natural resource management. Use of computer where applicable.

#### O SCI

#### 376 Operations Research in Resource Utilization I (3) A

Introduction to some of the tools of operations research and the application of these in examining, defining, analyzing, and solving complex problems of resource management and of resource product manufacturing. Emphasis is placed on networks and graphs, principally PERT analysis, and on linear programming and its extensions, such as the transportation assignment and transshipments

models. Sensitivity analysis and duality also are presented. Prerequisite, 391, which may be taken concurrently. (Formerly 396.)

#### Q SCI

#### Systems Analysis in Resource 471 Management (4) A

Nature of systems; systems goals and objec-tives; models; transformation of inputs to outputs; control systems; information; survey of methods of optimization; general systems; comparative systems; fishing systems; design and analysis of actual systems. Prerequisite, 291 or Mathematics 124. (Formerly 491.)

#### **O SCI**

#### **Operations Research in Resource** Utilization II (3) W

Presents additional operations research methods, principally model-building techniques and simulation approaches. Existing biological and physical models largely are taken for granted. These models are extended and interpreted within a social science framework. Specifically economic and managerial decision making under uncertainty, both when 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. (Formerly 496.)

#### O SCI

### 477 Advanced Mathematical Programming With Applications in Resource Management (3) Sp

Selected techniques from mathematical programming, with primary emphasis on the formulation, solution, and intepretation 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 Quantitative Methods 450 and 451. (Formerly 497.)

#### STATISTICAL METHODS

#### O 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, Mathematics 105 or equivalent.

#### O 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, negativebinomial, geometric, uniform normal, chi-square, "t" and "f" distributions discussed; point and interval estimation, basic concepts of hypothesis testing; applications to biological problems. Prerequisite, Mathematics 105 or equivalent.

#### Q SCI

#### 382, 383 Statistical Inference in Applied Research (5,5) AW,WSp

Analysis of variance and covariance; chisquare 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, Mathematics 124 or Quantitative Science 291 or permission for 382: 382 for 383.

#### Q SCI

#### 480 Sampling Theory for Biologists (4) Sp

Theory and applications of sampling finite populations including: simple random sampling, stratified random sampling, ratio estimates, regression estimates, systematics 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** Topics in analysis of variance and experi-mental designs: choice of designs, comparison of efficiency, power, sample size, use of computer for standard analyses. Prerequisite, 383 or Mathematics 485.

#### APPLIED ANALYSIS

#### Q SCI

### 292 Analysis for Biologists (3,3) AW,WSp 291, 292

Differentiation; integration including multiple integrals and partial derivatives. Numerical and computing techniques in analysis. Emphasis on biological problems, particularly in ecology. Prerequisites, Mathematics 105 for 291; 291 or Mathematics 124 for 292.

### Q SCI 391 Introduction to Matrices and Their Applications (3) A

Elementary concepts of matrices and matrix operations; use of computer in inverting matrices, solving systems of equations and other matrix operations; applications in operations research and biology. Prerequisites, 281, Mathematics 125 and 114, or Fisheries 340 or equivalent course in computer use, or permission.

### Q SCI 492 Techniques of Applied Mathematics in Biology I (3) A

Ordinary differential equations—linear and nonlinear; systems of differential equations; approximation techniques, numerical solution techniques; applications to biological proc-esses. Prerequisite, 292 or Mathematics 126, or permission. (Formerly 392.)

#### Q SCI

#### Techniques of Applied Mathematics in Biology II (3) W **493**

equations, special functions, and partial differential equations to descriptions of biological phenomena. Particular emphasis on transport in biological systems, including dif-fusion and fluid flow. Prerequisite, 492 or permission.

### 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.

### SOCIAL MANAGEMENT **OF TECHNOLOGY**

#### SMT

#### 498 Special Topics: Technology, Society, and Public Policy (3-5) AWSp

Special topics dealing with technology, so-ciety, and public policy offered as lectures and seminars. Topics include technology assessment, energy policy, role of technology in social policy formation, and institutional means of regulating technology. Prerequisite, permission.

#### SMT

#### 499 Special Research Projects: Technology, Society, and Public Policy (3-5, max. 10) AWSp

Independent individual or team undergraduate research projects dealing with technology, so-ciety, 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) AWSp,AWSp,AWSp Wenk

Analysis of the interaction of technology and society through general principles and case studies of contemporary issues and public policy: the nature of the technological enter-prise, its scientific base, ingredients of capital, specialized manpower, organizational struc-ture 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. Prerequisite, permission. (Last time -offered: Spring Quarter 1977.)

#### 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

#### and Management of Handicapped Children (3) AWSp Rolla

Multidisciplinary study of handicapped chil-dren, including identification of children with problems, clinical assessment by multidisciplinary team, formulation of plans for manageary team, formulation of plans for manage-ment, and reassessment in terms of progress made. (Offered cooperatively by School of Nursing, College of Education, departments of Pediatrics and Psychiatry in the School of Prediatrics and Psychiatry in the School of Medicine, departments of Psychology and Speech 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, assignment to a practicum at Child Development and Mental Retardation Center and evidence of knowledge in child development, or permission.

#### UCONJ

#### 415 Drug Abuse (2) Sp Hammarlund

In-depth and multidisciplinary course covering selected topics of drug abuse primarily de-signed 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 psy-chology, 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

#### 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 in-volved 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 Den-tistry, 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

#### 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.) 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 (3) W Manuwal

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 (4) A

Manuwal Major principles of avian population biology, reproductive biology, and conservation strategies for both game and nongame birds. Laboratory and field trips are required, and

students may be asked to share travel costs. Prerequisites, 350, two quarters of college biology, and permission.

### WLF S

#### 402 Wildlife and Man (3) W Taber

Human customs, attitudes, and institutions with regard to wild bird and mammal populations. Economics of wildlife populations. Governmental administration and custodianship of wildlife. Frictional relationships between human and wildlife populations (crop damage, public health, etc.). Prerequisite, 350 or permission.

#### WLF S

403 Wildlife and Land Use (3) Sp Taber

Review of natural habitats and faunas. Wildlife diversity and abundance in relation to range management, forest management, agricultural land management, wetlands; and in relation to human population growth and engineering developments (cities, highways, airports, dams, etc.), wildlife diversity and development. Prerequisite, 350 or permission.

#### WLF S

#### 404 Biology and Conservation of Mammals (4) W

Manuwal Major principles of mammalian population biology, reproductive biology, ecology, and conservation strategies for mammals of all categories. Laboratory and field trips are required, and students may be asked to share travel costs. Prerequisites, 350, two quarters

### SCHOOL OF LAW

of college biology, and permission.

#### LAW

#### 443 The Legal Process (6) S Fletcher, Huston

Designed for, and limited to, students who are not regularly enrolled in the School of Law, both graduate students and undergraduate students who have completed at least three-fourths of the work toward the undergraduate degree. Purpose of the course is to assist the students to understand the system of law and its functions in our society rather than to learn the substantive law pertaining to any particular subject or to any particular academic discipline. Offered on credit/no credit basis only.

#### LAW

#### **Constitutional Freedom and American** 444 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 non-law students enrolled as graduate students or as upper-division undergraduates. Offered jointly with the College of Education as EDEPS 444. Satisfactory/not satisfactory option available to nonlaw students only.

#### FIRST YEAR

#### LAW

500 Administrative Law IV (4) Section A, Sp Andersen, Tunks

Administrative process and its role in the legal system. Because the administrative process involves action that is susceptible of characterization as executive, legislative, and judicial, a considerable portion of the course involves a study of the relationship of administrative agencies with these more traditional departments of government. Both formal and informal administrative procedures are examined.

#### LAW

501 Contracts (8) AWSp

Corker, Cosway, 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 benefi-ciaries. More limited coverage is accorded interpretation, the parol evidence rule, the statute of frauds and illegality. (Formerly 400.)

#### LA₩

504 **Civil Procedure (6) AW** 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. (Formerly 410.)

#### LAW

#### 512 Legal Research and Analysis (6) AWSp

Crooks, Dybwad, Lyness, Rombauer Integrated introduction to analysis, research, and legal writing. In the introductory phase, how to study law including briefing, basic decision analysis, synthesis of decisions, and problem-solving elements are discussed. The next phase continues a more intensive introduction to basic research tools through instruction in legal bibliography. Students integrate their research, analysis, problem solving, and writing skills through preparation of office memoranda or exercises in drafting or preparation of memoranda for lower courts. In the final phase, students prepare appellate briefs and argue orally before a moot appellate court. (Formerly 416.)

#### LAW

#### 514 Property I (8) AWSp

Cross, Dybwad, Prosterman, Stoebuck Ownership and transfer of realty and personalty. 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: (Formerly 430.)

#### LAW

### 517 Torts (8) AW

Fletcher, Millar, Seawell Liability for civil injuries arising from the intentional and unintentional interference with personal and property interests. (Formerly 440.)

#### LAW

#### 518 Criminal Law (5) Sp

Hardisty, Junker

Definitions of principal crimes and defenses to criminal prosecution, both common law and statutory, along with a critique of these definitions in light of the actual roles and goals of criminal law processes in a democratic society.

#### SECOND- AND THIRD-YEAR ELECTIVES

#### LAW

#### 502 Land Use Controls (3) W

Hunt

Limitations imposed on the use of land, with primary emphasis on regulation by public action. Particular attention is devoted to the official map, the comprehensive plan, zoning (substance and procedure), subdivision regulation, urban redevelopment, and building and housing codes. Some attention also may be given to private restrictions, such as the law of nuisance and running covenants.

#### LAW

#### 503 Associations I (3) A Tunks

Introduction to law relating to association in business and its nonprofit analogues through agency, partnership, other unincorporated forms, 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 Corporations VI (6) AW Kummert

Basic corporation law and practice. The course 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 share-holders; corporate and shareholders' litigation; mergers, sales of assets, and other fundamental changes in the corporate structure. Emphasis is "federal corporation law" placed on the evolving out of the SEC proxy rules and Rule 10-b-5.

#### LAW

#### 506 Corporations IV (4) Sp Hjorth, Price A shorter version of 505.

#### LAW

#### 507 Business Planning (6) AW Kummert

Advanced work in corporations and federal taxation in the context of business planning and counseling. Examination is made of a series of problems involving common business transactions and presenting corporate and tax issues for analysis and resolution. The 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. Prerequisite, 505 or 506. Students normally should complete 532 before taking 507. With permission of the instructor, however, students may take the necessary tax course concurrently with 507.

#### LAW

#### 508 Securities Regulation (3) Sp Hunt

Legal controls over the issuance and distribution of corporate securities with primary emphasis on federal regulation: registration and distribution under the Securities Act of 1933; regulation of trading under the Securities and Exchange Act of 1934; regulation of investment companies under the Investment Company Act of 1940; regulation under state Blue Sky laws. Prerequisite, 505 or 506. (Not offered every year.)

#### LAW

#### 509 Federal Courts and the Federal System (4) Sp

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. Prerequisite, 520. May be taken concurrently with section B of 520.

#### LAW

#### 510 Legal Problems Relating to Women (3) Sp Dybwad

Includes an examination of existing bases for attacking unjustified discrimination against women (e.g., the equal protection clause, the Ninth Amendment, the Civil Rights Act of 1964, EEOC guidelines under the Civil Rights Act, federal antidiscrimination statutes and executive orders, the Washington equal employment statute) and of the vehicles by which unjustified discrimination against women might best be attacked (constitutional amendment, court actions, etc.). Selected problems with respect to discrimination under state and federal statutes and regulations are examined with a view to identifying unjustified discrimination, the legal processes by which change might best be effected, and the possible impact of 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.

### 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.

#### 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); processes for the selection of party candidates; ballot propositions and reporting and similar topics. Some of the problems involved in redistricting in accordance with the one-man-one-vote principle may also be examined. Open to law students; offered on credit/no credit basis for nonlaw students only. (Not offered every year.)

#### LAW

#### 516 Commercial Transactions V (5) WSp 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 Commerical Code.

#### LAW

#### 519 Negotiation: Dispute Settlement and Planning (3) Sp

Lyness Study of the negotiation process and its interrelationship with litigation and counseling. The materials used include actual case histories of settlements negotiated with respect to such matters as personal injuries, property distribution in contested divorces, will contests, contract disputes, and 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.

#### LAW

#### 520 Constitutional Law VIII (8) Section A, AW; Section B, AWSp

Corker, Fletcher

Principles of constitutional law under the United States Constitution as they relate to the scope of, and limitations on, the powers of state and national governments in dealing with matters of life, liberty, and property. Federal-state relationships and the constitutional role of the courts are also analyzed.

#### LAW

#### 521 Economic Analysis of Law (3) S Andersen

Introductory exploration of the applicability of general economic methodology to the analysis of a wide variety of legal subjects, including contracts, property, criminal law, government regulations, taxation, wealth transmission, federalism, and the legal process. No prior background in economics necessary.

#### LAW

### 523 Evidence III (3) Sp

Gallagher Selected rules of evidence analyzed, with emphasis on the hearsay rule and its exceptions.

#### LAW

#### 524 Contemporary Maritime Law Problems (2) Sp

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, multination organizations, federal regulation, marine insurance, port facilities, maritime litigation, and the impact of various courts). (Not offered every year.)

#### LAW

#### 526 Equitable Remedies III (3) Sp Seawell

Basic substantive and procedural rules developed and applied in equity. Emphasis on issues arising out of the formulation, modification, and enforcement of an equitable decree. Procedural devices developed in equity for managing multiparty litigation and for hastening the determination of rights also considered.

LAW

#### 527 Contemporary Problems in Copyrights, Patents, and Trademarks (3) Sp *Gallagher*

Introduction to the federal laws of copyrights, patents, and trademarks and their relation to unfair competition doctrines under state law. Taxation, licensing, and litigation aspects are considered. Contemporary issues examined include photocopying, CATV broadcasting, computer programs, and franchising. (Not offered every year.)

#### LAW

#### 528 Public International Law (3) S Hiorth

International law as a process of decision; recognition and diplomatic intercourse; allocation of international resources; agreements between states; jurisdiction. (Not offered every year.)

#### LAW

#### 529 Natural Resources (3) S Corker

Legal problems of water use and environmental problems. Riparian and appropriation systems; evolution of administrative controls; changing relationships of local, state, and federal governments; interstate compacts. (Not offered every year.)

#### LAW

#### 531 Federal Income Taxation III (3) WS Hjorth, Kummert

Survey of the basic structure of federal income taxation undertaken in the context of planning personal and commercial transactions of individual taxpayers. Matters considered: items of income, transactions concerning capital assets, deductions, tax accounting, indirect and deferred compensation for services, family transactions, elementary business transactions, and special tax problems of creative persons and investors.

LAW

#### 532 Federal Income Taxation VI (6) AW Hjorth, Tunks

Study of the nature of income and the gross income concept; statutory exclusions from income; personal deductions; business deductions; income splitting through trust and nontrust arrangements; special provisions for the treatment of gains and losses in respect to capital assets; partnership taxation; and the basic provisions relating to corporate income tax treatment. Procedural rules and the principal accounting devices are examined.

#### LAW

#### 533 Federal Tax Procedure (3) W Hiorth

Consideration of procedural problems involved in the settlement of tax disputes. Topics covered include (1) return and filing requirements; (2) deficiencies 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 vear.)

#### 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 ques-tions in the Washington context without risking provincialism.

#### LAW

#### 535 Property II (8) Section A, AW; Section B, WSp

Fletcher, 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) W 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. Enrollment limited to twenty-five students.

#### 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 on the former.

#### LAW

#### 539 Real Property Security (3) Sp 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 (4) Sp 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.

#### LAW

#### 541 Corporate Finance and Investment Protection (4) A

Chisum

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 (3) Chisum

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 nonlaw students only. (Not offered every year.)

#### LAW

546 Legal History (3) W Stuebuck

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

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

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) W Henderson

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.

#### ŁAW

#### 553 Conflict of Laws VI (6) WSp 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 that 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. (Not offered every year.)

#### LAW

555 Creditor-Debtor Law (4) W

F. W. Smith Principal rights and remedies of unsecured creditors, individually and collectively. Among matters discussed are judgments and judgment liens, executions, attachments, garnishments, fraudulent conveyances, compositions, assignments for the benefit of creditors, and debtors' exemptions. Bankruptcy emphasized. Strongly recommended that student has taken or is currently taking 538.

#### LAW

#### 556 Criminal Procedure VI (6) AW Junker

State and federal rules of criminal procedure, including the constitutionally derived procedural rights of those accused of crime.

#### LAW

#### 558 Death and Gift Taxation (3) A Huston

Federal and state death and gift tax systems. The majors subdivisions covered include basic application of death and gift taxes, transfers subject to both, and the application of death and gift taxes to joint interests, community property, and life insurance. Territorial jurisdiction to impose these taxes is considered, as are the various components of the tax liability and the valuation for tax purposes of property transferred.

#### LAW

#### 559 Domestic Relations (3) Section A, A; Section B, W

Hardisty, Rieke Law pertaining to marriage, protection of the

marital relation, disintegration of the family relation, divorce, adoption, and legitimacy. Washington law is emphasized, with comparisons being made to the law of other jurisdictions. Consideration is given to related problems such as conflict of laws, jurisdiction, procedure, costs, alimony, support, property division, custody, and modification of orders and their enforcement.

#### LAW

#### 560 Estate Planning Workshop (3) W Price

The use of various lifetime and death-time methods of disposing of property to meet the owner's objectives at the least cost in terms of inconvenience to the owner and his successors and in terms of income, gift, and estate taxes. The course includes a consideration of selected provisions of the federal income, estate, and gift tax laws and the analysis of problems. Pre-. requisites, 535 and 558.

#### LAW

#### 561 Evidence (5) AW C. Z. Smith

Scope and function of rules of evidence analyzed in the context of trial practice. Major problems covered include examination of witnesses, 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.

#### LAW

#### 562 Juvenile Courts (3) W Hardisty

The following aspects of the juvenile justice system are covered: philosophical bases, criminal and noncriminal delinquency jurisdiction, neglect and dependency jurisdiction, constitutional procedural safeguards, police investigation, case intake, preliminary screening, detention, waiver of juvenile court jurisdiction, hearing and corrections. (Not offered every year.)

#### LAW

#### 563 Government Regulation of Business (5) WSp

### Armitage

Control of economic activity by attempts to encourage and maintain competition. The law of antirust is studied and contrasted to government ownership and direct supervision. Particular attention is given to monopolies, restraints of trade, mergers, and price discrimination. Emphasis on statutory interpretation, including Sherman Act, Clayton Act, Robinson-Patman Act, and Federal Trade Commission Act. Preservation of competition is examined as the fundamental national economic policy.

#### LAW

#### 564 Insurance (3) A Roddis

Legal principles governing formal mechanisms for the distribution of the risk of loss. Primary emphasis on property and casualty and life and disability insurance. Areas considered include insurance marketing, the principle of indemnity, insurable interests, amount of recovery and subrogation, persons and interests protected, the 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. (Not offered every year.)

#### LAW

#### 566 Jurisprudence and Legal Philosophy (4) AW

Morris

Introduction to legal philosophy. The coverage in this course varies each year. Some of the traditional schools of jurisprudence as represented by selected authors are considered, and usually there is an analysis of the method and aims of jurisprudence in light of recent writings. Occasionally the course focuses on one or two legal concepts. Enrollment limited to ten students.

#### LAW

#### 567 Labor Law (3) A

Chisum

Labor problems preceding the establishment of a collective bargaining relationship. More specifically, the course is concerned with the relationship of the individual employee with the union, and the organizational rights of the employee and the union. Included is a coverage of the economic weapons available to parties to labor disputes. Since this background provides the basis for understanding the bargaining process in which the parties engage, it is desirable that this course be taken by students who plan to take 568. It is also recommended that students taking this course first take either 500 or 501.

#### LAW

#### 568 Labor Relations (3) W Peck

Processes of collective bargaining. Included is a coverage of the statutory duty to bargain and

problems that arise under specific contract clauses. Administration of the contract is also the subject of 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 and recommended that they take either 500 or 501. (Not offered every year.)

#### LAW

#### 569 Professional Responsibility (1) Sp Hunt

Selected problems arising under the Code of Professional Responsibility: maintaining the integrity and competence of the legal profession; making legal services available; preventing unauthorized practice of law; preserving clients' confidences and secrets; exercising independent professional judgment; representing a client competently and zealously within the bounds of the law; improving the legal system; and avoiding professional impropriety.

#### LAW

## 570 Workshop in Legislation (4) WSp Johnson

Each student selects a bill or group of bills then pending in the state Legislature and prepares a research paper around that bill or group of bills. The class makes group field trips to Olympia. Individual students are urged to attend legislative hearings in connection with their selected bills and to interview legislators, lobbyists, and others. The class meets to discuss background materials from a standard casebook and to go over individual projects. No final examination is given. The grade depends on the report noted above. The report should cover the origin of the proposed legislation, the lobbying groups for and against it, the soundness of the approach, a section-by-section analysis, statutory drafting, and constitutional questions. Enrollment is limited to fifteen students.

#### LAW

#### 571 Local Government Law (3) A

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.)

#### LÁW

#### 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 "overpromoling." (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.

#### 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

#### 580 Trial and Appellate Practice (5) WSp Millar

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.

#### LAW

#### 585 Problems in Evidence (14) Section A, W; Section B, Sp

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 523 and 561 on the basic subject matter.

#### LAW

#### 586 International Legal Order (3) W 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 crisis, and the civil war in Cyprus. This is done against a broader background of analytical materials on the causation and prevention of large-scale lethal violence.

#### LAW

#### 587 International Law of the Sea (3) A Burke

Examination of the way nation-states regulate activities on and under the ocean. The course covers the international regulations and institutions concerned with fishery exploitation, pollution, transit rights, scientific research, fuel and nonfuel mineral development, and the boundary issues involved in these various ocean uses.

### LAW

588 Workshop in Land-Use Planning Law (3) W

#### Hunt

Workshop in selected problems of land-use controls, with specific reference to planning, zoning, and subdivision regulations. The emphasis is on the interrelationship of the respective roles of lawyer and planner in the planning process. Certain concepts, problems, practices, and procedures are discussed in depth, and several short written memoranda are required. Open to second- and third-year law students and to applicants for a graduate degree in urban planning. Enrollment limited at the discretion of the instructor. (Not offered every year.)

#### LAW

590 Corporate Income Tax (3) Sp 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

#### 591 International Utilization and Management of World Fisheries (3) Sp Burke

Existing and expected utilization of living marine resources (including mammals), the source, intensity, and details of management problems, and the legal framework and specific arrangements devised to cope with such problems on a worldwide basis. (Not offered every year.)

### LAW

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#### 593 Social Legislation (3) Sp 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 Hiorth

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 for independent study in any of the major fields covered by the curriculum.

#### LAW

#### 603 Clinical Clerkships (9) AWSp Chisum, Staff

Students who have completed two years of law study and are qualified for internship under Rule Nine 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 to those who have taken a clerkship for only one quarter. Offered on credit/no credit basis only.

#### LAW

#### 605 Research and Writing (\*)

Alternative to satisfy the research and writing requirement for graduation, in addition to offerings presently designated as six-hour seminars.

#### SEMINARS

#### LAW

#### 613 Corporate Finance and Investment Regulation Seminar (6) AWSp Chisum

Examines problems in the area of corporate finance and the regulation of securities sales and securities trading markets. Selected readings and one or more research papers required.

#### LAW

#### 614 Criminal Procedure Seminar (6) AWSp Junker

A critical study of the criminal law and related processes at various stages from detention to appeal, including a study of state and federal rules of criminal procedure, and the constitutionally derived procedural rights of persons accused of crime or other deviant behavior. Possibilities for research include field studies of enforcement practices and studies of the procedure in "quasi-criminal" proceedings involving juveniles, parolees and probationers, alleged mental incompetents, and other persons subject to a loss liability based on a violation of official norms. Enrollment limited to eight students Prerequisites, 556, 520.

### LAW

#### 615 Indian Legal Problems Seminar (6) AWSp

Johnson

Students in this seminar may choose topics for research that concern Indian tribal laws, con-

flicts of laws between Indian and non-Indian laws, federal laws concerning Indians, or state laws concerning Indians. A major piece of research and writing is required.

#### LAW

#### 616 Federal Court Seminar (6) AWSp Meisenholder

Selected topics in the structure, function, and power of federal courts. Problems not covered in depth in federal courts and the federal system are considered. Primary emphasis placed on individual research in the production of a written paper. Enrollment limited to eight third-year students.

#### LAW

#### 617 Federal Tax Policy Seminar (6) AWSp 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

#### LAW

#### 622 **Consumer Protection Seminar (6) AWSp.** F. W. Smith

Examines selected problems in consumer protection, including those arising from the use of consumer credit, the dissemination of credit information, fraudulent and deceptive practices, and those related to health and safety protection. Consideration is given to methods of providing protection, such as existing legislation, the proposed Uniform Consumer Credit Code, and consumer education. Each student is expected to produce a high-quality paper.

#### LAW

#### 623 Natural Resources Seminar (6) AWSp Corker

Selected legal problems relating to natural resources. Problems are chosen from among those relating to (1) water allocation; (2) environmental impacts of electric power generation by (a) falling water, (b) fossil fuel, (c) nuclear energy. Preference in enrollment given to those who have completed 574 and to those who will complete that course during the year. (Not offered every year.)

#### LAW

#### 624 Ocean Resources Seminar (6) AWSp 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. Enrollment limited to eight students and open to second-year students with permission.

#### LAW

#### 625 The Supreme Court and the Constitution (6) AWSp

Morris

Concentrates upon the basic problems inherent in the relationship of the individual to authority and in the protection of political and civil rights including the rights of minority groups. Current problems, as illustrated by recent or pending Supreme Court cases, are emphasized. Students are required to do substantial amounts of in-depth research, including, but not limited to, an isolation of the history of the doctrines involved, their relations to intellectual endeavor in related areas, and an exploration of alternative, competing solutions to modern problems. The seminar runs throughout the year, but there are times of recess to facilitate student preparation of a high-quality paper which, in turn, is thoroughly discussed by the seminar group, plus rewrit-ing(s). Enrollment is limited to six second- or third-year students, with permission.

#### LAW

#### 627 Selected Problems on Environmental **Protection Seminar (6) AWSp** Durning

Examines legal problems resulting from impairment of the environment by technological advances and urban growth. Various issues, advances and urban grown. various issues, including air and water pollution, the use of pesticides, protection of wildlife, and transpor-tation 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 (6) AWSp Andersen

An opportunity to explore in depth selected legal problems arising from our efforts to govern urban areas and to finance the services they require. More specific subject matter coverage is contained in course descriptions for 575 and 577. Prerequisite, 571 or 575.

#### LAW

#### 631 Human Ecology Seminar (6) AWSp Rieke

Selected problems drawn from such areas as poverty, welfare, health, or correction pro-grams. Emphasis on the relation of a nonlegal system and the legal system with respect to specific problem (e.g., medicine and law re-lated to alcoholism; social casework and law related to child abuse; parole board opera-tion and law related to deviancy; community organization and law related to "model city" structure, etc.) in order to evaluate interaction. It is anticipated that students will work with materials from one discipline other than law. Students are expected to develop the requisite personal contacts with professionals or students in such other disciplines. Joint research with a graduate or professional student in another discipline is welcomed.

### LAW 633 Donative Transmission of Wealth Seminar (6) AWSp

Fletcher

Studies the adequacy with which modern law facilitates the donative transmission of wealth, effectuating the reasonable wishes of the donor, providing for the needs of the immediate family, meeting the reasonable expectations of family and others as to the donor's property, and satisfying other demands of society. Incident to that study, it considers the relative availability of various types of property to the reach of creditors, of taxing bodies, and of other claimants, and the cost and adequacy of the various mechanisms by which donative transmission is effected. Specific topics may include an intensive study of parts of the Uniform Probate Code (1969) and of other statutory patterns and may also include the preparation of proposals for comprehensive statutory treatment of various subjects. The seminar presupposes a basic knowledge of wills, trusts, and future interests, some knowledge of the wealth transmission aspects of various forms of property ownership and of certain contractual relationships such as insurance, and at least a modest acquaintance with federal estate and gift taxation. A paper is required. Prerequisite, 535; 551 and 558, which may be taken concurrently, recommended. (Not offered every year.)

#### LAW

#### 635 International Legal Order Seminar (6) AWSp

#### Prosterman

Focuses on the international legal context, especially bilateral or multilateral foreign-aid mechanisms, which promote or inhibit democratic development and economic growth: income redistribution including land reform, population limitation, food production, en-vironmental damage, and "limits to growth" among major problems considered.

#### LAW

#### 637 The Mentally Disabled and the Law Seminar (6) AWSp Hardisty

For research, students may choose topics that concern the legal problems of the mentally disordered and the mentally retarded. Possible research problems include those relating to civil. and criminal commitment and release, to treatment and hospital procedures, to incompe-tency, and to insanity defenses. The primary objective is the production by each student of a high-quality paper resulting from research, writing, and rewriting. Experts in various fields are invited to participate in the seminar. Enrollment limited to eight second- or third-year students. Prerequisite, 513, which may be taken concurrently.

#### LAW

#### 638 Estate Planning Seminar (6) AWSp Price

Supplement to the Estate Planning Workshop, which is problem or practice oriented. In the seminar, some of the problems taken up in the workshop are subjected to an advanced analysis (e.g., the use of the widow's election, private annuities, etc.), and some additional topics are considered in depth. Among the latter are the problems of migratory clients (i.e., those who came to community property states from common law states and vice versa). Their problems are considered in light of the existing law (including Cal. Probate Code sec. 201.5) and proposals made for legislation in common law states. Seminar papers are based on traditional research and, possibly, directed empirical research. Prerequisite, 535; 532 and 558, which may be taken concurrently, recommended. (Not offered every year.)

#### LAW

#### 640 Land Use Controls Seminar (6) Hunt

Preparation of a series of papers on state land use control programs and proposals, with particular emphasis on the efforts of the Washington State Land Planning Commission.

#### LAW

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#### 641 Federal Tax Seminar (6) Hiorth

Intensive examination of selected areas of federal taxation. The student is expected to

prepare a high-quality paper. Enrollment limited to eight third-year students who have had 590 or by permission.

#### LAW

### 642 Race, Racism, and American Law Seminar (6) AWSp 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 strengths and weaknesses of such an approach.

#### **Postgraduate Courses**

LAW

#### 545 Legal Analysis and Research for **Students Not Trained in the Common** Law System (4) AW Rombauer

Integrated introduction to legal analysis, research, and writing for students trained in a non-common-law system. Papers on two or three major research projects are required. This course is for graduate students who have already attained a professional standing in law, but who require experience in using American law sources.

#### I.AW

#### 548 United States-Japanese Tax Problems (4) Sp

Huston

Operation of the income-tax laws of Japan on income earned in Japan by American nationals and on income earned in the United States by Japanese nationals; and with the operation of the income-tax laws of the United States on income earned in the United States by Japanese nationals, and on income earned in Japan by American nationals. A series of problems based on transnational business transactions are solved by individual students, whose solutions are scrutinized by the class.

#### LAW

#### 549 United States-Japanese Administrative Law Problems (3) W Swisher

Course is concerned with selected administrative law problems, discussed comparatively in terms of Japanese and United States law. Especially emphasized are the legal principles that govern the procedural and decision-making aspects of the administrative process, the Japanese concept "administrative guidance," and the possibilities that gaps between theory and practice may exist. (Not offered every year.)

#### LAW

#### 596 Justiciability Under the Civil Law and the Common Law (4) A Henderson

Problems of justiciability in the transnational setting, with particular emphasis on the differences between civil law and common law. Considered are the potential and limitations in litigation, arbitration, and conciliation in transnational transactions; problems about the legal status of aliens; functions of bureaucracies in private transactions.

#### LAW

#### 597 United States-Japanese Contract and Sales Problems (4) A Swisher

Basic contract and sales principles in Japanese and United States law are discussed, and term papers based on transnational transactions involving-these countries are prepared. (Not offered every year.)

LAW

#### 598 United States-Japanese Corporate Relations (4) S Swisher

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 or Republic of China). Discussion is comparative.

#### LAW

#### 620 Tutorial in Japanese Law (6) AWSp Henderson, Staff

Individual research project handled on a tutorial basis, involving an area of law of mutual interest to student and teacher. In the case of a student whose basic training was in a civil law jurisdiction, the subject matter of the tutorial is a topic selected from the law and 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

Permission of the Director of the school is required for all librarianship courses.

#### LIBR

Libraries and Society (3) 440

## Lieberman

Introduction to the principal types of libraries and to issues and trends in modern librarianship. A prerequisite to graduate courses in librarianship.

#### LIRR

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) 11

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

#### **Administration of the School Library** 454 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)

Skellev

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)

Lectures and demonstrations in archival administration, organization of manuscript collections, and study of the principles and techniques em-

### MEDICINE

ployed by state archival and historical institutions.

#### LIBR

480 Supervision of Public School Library Systems (3) Áhlers

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 ma-terials. Emphasis on practical methods of the documentation cycle.

#### LIBR

#### 496 Library Analysis (3)

The library as an object of study. Introduction to some concepts and notation of systems analysis, with application to libraries.

#### LIBR

#### **Computers and Libraries (3)** 497

Mignon Development of computers and their role in libraries, Introduction to library automation.

LIBR

#### Introduction to Document Retrieval 498 Systems (3)

Mignon

Introduction to computer-based information storage and retrieval systems for collections of documents. Design sequence including: goals, specifications, functional components, measures of performance, and evaluation. Prerequisite, 497 or permission.

#### LIBR

#### 502 Library Organization and Administration (3)

Study of public and academic library service, including a consideration of legal structure; finance and statistics; buildings and equipment; personnel; public relations; and other phases of library management. The extension of library service is also considered.

#### LIBR

#### Directed Field Work (2-4) 509

Lieberman Four weeks of professionally supervised field work in various types of libraries.

#### LIBR

#### 513 Government Publications (3) Nelson

Government publications of the United States and foreign countries, their acquisition, organization, and use.

#### LIBR

### 514 The Library and Audio-Visual Materials (3) Lieberman

Types, cost, utility, and characteristics of modern sensory aids employed in communicating ideas; organization for handling films, filmstrips, recordings and transcriptions, slides, pictures, exhibits, and similar materials in the library; experience in operating various types of equipment; techniques in extending the use of audiovisual materials by community groups; sources of information about materials and equipment. Prerequisite, EDC&I 480, 481 or equivalent.

#### LIBR

## 515 Bibliography; Library Materials in the Humanities (3)

Nelson, Skelley Examination of national and international problems of bibliographic control. Study and evaluation of library resources in the humanities. Prerequisite, 441.

#### LIBR

## 516 Library Materials in the Social Sciences (3) Nelson, Skelley

Study and evaluation of library resources in the social sciences, with attention to information problems peculiar to these fields. Prerequisite, **Š**15.

#### 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 charac-teristics 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 headings. Emphasis is on theory and practice in the use of the scheme. Prerequisites, 443, 535.

#### LIBR

#### Advanced Legal Bibliography (2) 540 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) Ahlers

Problems and trends that affect the school library media program are considered in group discussion and independent study. Prerequisite, 454 or equivalent. (Formerly 485.)

#### LIBR

#### 590 Special Topics in Librarianship (3)

Seminar dealing with various topics in librarianship. Offered by visitors or resident faculty. Topics 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) Mignon

Introduction to research methods commonly used in library and information science. Emhasis is 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

#### ANEST

#### Basic Anesthesia Clerkship (3) AWSpS 480 Bonica

Introduction to the principles of airway management and ventilatory support, use of local anesthetics, techniques of resuscitation, techniques of patient monitoring, fluid therapy, preoperative and postoperative patient evaluation, and pathology of anesthesia. Skills taught include airway management, venipuncture, lumbar puncture and endotracheal intubation. Prerequisite, third- or fourth-year student. (2 weeks, full time. Limit: one to six students.) All affiliated hospitals.

#### ANEST

#### 481 Advanced Clerkship in Anesthesiology (6) AWSpS Bonica

Clerkship for students interested in some facet of anesthesiology or desiring greater exposure to anesthesia as a specialty. Individual programs can be arranged in the following areas: respiratory care, surgical anesthesia, obstetrical anesthesia, and pain clinic. Prerequisite, 480 or first two weeks on surgical anesthesia. (4 weeks, full time. Limit: one student in each area.) All affiliated hospitals.

#### ANEST

#### 497 Anesthesiology Special Electives (\*) AWSpS

Bonica

By specific arrangement for qualified students, special clerkships, externship, or research opportunities can at times be made available at institutions other than the University of Washington. Faculty can advise students of possible opportunities. Students wishing to elect this course should obtain a "Special Assignment" form from the Dean's office at least one month before advance registration. Prerequisite, permission. (6 to 12 weeks.)

#### ANEST

#### Undergraduate Thesis (\*) AWSpS 498 Bonica

By special arrangement. Time and credit to be arranged.

#### ANEST

#### Undergraduate Research (\*) AWSpS 499 Bonica

Specific research problems relating to pulmonary, cardiovascular, renal, obstetric, and central nervous system functions, and their alteration by anesthetic techniques and agents. (6 weeks, full time. Limit: two students.)

#### BIOCHEMISTRY

BIOC

#### 400 General Chemistry and Molecular Biology (5) S

Lectures and laboratory exercises dealing with the general principles of biochemistry and molecular biology. Designed for teachers of high school and junior college science. Laboratory 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 struc-ture-function relationships of biologically important molecules. This course does not fulfill the prerequisites for advanced courses in biochemistry (see 440, 441, 442). Prerequisite, organic chemistry or permission.

### BIOC

#### 408 Introduction to Biochemistry Laboratory (3) Sp

Laboratory exercises in general biochemistry for students in medical technology and other undergraduate students by permission. Prerequisite, 405, which may be taken concurrently.

#### BIOC

#### 412 Medical Students' Laboratory (3) Sp Bard

Content similar to 444. When possible, the relationship of the biochemical techniques or experiments being performed to clinical or diagnostic medicine is demonstrated or discussed. For medical students and others by permission. Prerequisites, Human Biology 414, 424 or equivalent and permission.

#### BIOĆ

415 Blochemistry Review I (1) A Elective quiz section to clarify and amplify material presented in Human Biology 414.

#### BIOC

425 Biochemistry Review II (1) W Elective quiz section to clarify and amplify material presented in Human Biology 424.

#### BIOC

#### 440, 441, 442 Molecular Biology (3,3,3) 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 new curriculum in molecular and cellular biology and graduate students in other science departments. Prerequisites, Chemistry 337 or permission for 440; 440 for 441; 441 for 442; introductory physical chemistry recommended.

#### BIOC

#### Molecular Biology Laboratory (3) W 444 Bard

Laboratory projects and conferences designed to acquaint the student with many of the current techniques of biochemistry. All students perform certain basic experiments, but a number of optional experiments are available. Prerequisite, 440 or equivalent and permission.

#### BIOC

#### 498 Undergraduate Thesis (\*) AWSpS For senior medical students. Prerequisite, per-

mission.

### 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.

#### **Courses for Graduates Only**

520 Seminar (1-3, max. 9) AWSp

Seminar dealing with special topics in the field of biochemistry. May be repeated for credit. 1

#### 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 comprehen-sive course in biochemistry and permission.

#### BIOC

#### 532 Advanced Biochemistry (3) Sp

Graduate-level discussion of nucleic acid structure, RNA viruses including oncogenic viruses, RNA biosynthesis, protein biosynthesis, and eukaryotic cell cycle. Prerequisites, a comprehensive course in biochemistry and permission.

#### BIOC

#### 540, 541, 542 Literature Review (2 or 3, 2 or 3, 2 or 3) A,W,Sp

Emphasizes critical evaluation of original articles in the literature. Coordinated with 440, 441, 442, and to be taken concurrently. For first-year graduate students in biochemistry and students of other science departments, with permission.

#### BIOC

560 Physical Biochemistry (3) A Specialized aspects of physical chemistry as applied to systems of biological interest. Particular emphasis on hydrodynamic and optical. properties of macromolecules. Prerequisite, physical chemistry.

#### BIOC

#### 574 The Biochemical Basis of Disease (2) Sp 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 Human Biology 414, 424 or permission.

#### BIOC

#### 583 Advanced Techniques in Biochemistry (3) W

involving Intensive course 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, Gordon

Review of the current literature on the control of cellular processes at the molecular level. Topics include hormonal control of mammalian systems, role of cyclic-AMP in pro- and eukary-otic 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) **ÁWSpS**

Hauschka, Keller, Nameroff

Weekly conference in which recent literature on animal cell membranes is discussed. May be repeated for credit. Prerequisite, permission.

#### MEDICINE

#### BIOC

#### **Current Topics in Molecular and** 588 Cellular Biology (1) AWSpS

Byers, Keller, Morris, Shapiro, Young Critical evaluation of the biochemical literature in areas related to molecular and cellular biology. May be repeated for credit. Prerequisite. permission.

#### BIOC

#### 589 Connective Tissue Macromolecules (1) AWSpS

Bornstein

Seminars designed to discuss current knowledge of the biochemistry and pathophysiology of fibrous proteins and other structural macromolecules. Prerequisite, 442 or Human Biology 414, 424 or permission.

#### BIOC

#### 590 Proteins and Enzymes Seminar (1, max. 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) AWSp8 Morris

Control of enzyme activity and gene expression related to biology of growth and function. May be repeated for credit. Prerequisite, permission.

### BIOC

594 Glycogen Metabolism Seminar (1) AWSpS

Fischer

Weekly conferences on research in glycogen metabolism. May be repeated for credit. Prerequisite, permission.

#### BIOC

#### 595 Cell Surfaces and Cell Division (1) AWSpS

Shapiro

Weekly research conferences on the role of the cell surface in cell division and development. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite, permission.

#### BIOC

#### **Clinical Chemistry Seminar (1) AWSpS** 596 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.

#### 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

#### Seminar in Physical Chemistry of 599 Polymers (1) Teller

Weekly conferences on current research in the physical chemistry of macromolecules. For graduate students in biochemistry. May be repeated for credit. Prerequisite, permission.

#### BIOC

600 Independent Study or Research (\*)

#### BIOC 700 Master's Thesis (\*)

BIOC

800 Doctoral Dissertation (\*)

#### BIOENGINEERING

See Interschool or Intercollege Programs.

#### **BIOLOGICAL STRUCTURE**

#### **B**STR

301 General Anatomy. (4) Sp 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.

#### BSTR

#### 340 Systemic Anatomy for Dental Students (5) A

Broderson

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.

#### BSTR

#### 350 Surgical Anatomy for Dental Students (4) Šp

#### 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.

#### CONI

400 Human Anatomy and Physiology (6 or 9) (See Conjoint Courses.)

#### **B STR**

#### 401 Gross Anatomy (2-6) A

Graney, Rosse

Lecture and dissection course in regional human anatomy: thorax, abdomen, pelvis, and perineum. For graduate students and medical students; others by permission.

#### **B**STR

#### 402 Gross Anatomy (3) W

Graney, Rosse

Lecture and dissection course in regional anatomy: upper and lower extremities. For graduate students and medical students; others by permission. (Formerly 403.)

#### **B**STR

#### 403 Gross Anatomy (4) Sp

Graney, Rosse

Lecture course in regional human anatomy: head and neck. For graduate students and medical students; others by permission. (Formerly 402.)

#### **B**STR

#### 404 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.

#### **BSTR**

#### 411 Structure and Function (3-4) W Eddy, Koehler

Introduction to the principles of cytological experimentation, including a survey of microscopic and other instrumental techniques. Emphasis is toward a detailed analysis of cellular architecture, particularly as it can be related to functional considerations and the dynamic behavior of cells. Cellular membranes, organelles, nuclear constituents, and organization are discussed. Laboratory optional. Prerequisite, permission.

#### **B**STR

#### 412 Human Microanatomy (4) Sp **Roosen-Runge**

Lectures and laboratory treating the specialized tissues and organs of the body from the microscopic and ultramicroscopic points of view. Prerequisite, permission.

#### **B**STR

#### 415 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, Conjoint 400, Mechanical Engineering 340, or permission.

### **BSTR**

429. Neuroanatomy (31/2) Sp Lund

Comparative approach to the nervous system of mammals, more particularly, primates, in-cluding man. Prerequisite, permission.

#### BSTR

#### 440 Special Topics in Dissection .(1-6, max. 6) AWSpS

Broderson, Graney, Kashiwa, Rosse Guided dissection. Primarily for advanced medical students. Prerequisite, permission.

#### **B** STR

#### 475 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.

#### **B**STR

#### Biological Structure Special Electives (\*) 497 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. (6-12 weeks.)

#### **B**STR

498 Undergraduate Thesis (\*) AWSpS Prerequisite, permission.

#### **BSTR**

499 Undergraduate Research (\*) AWSpS Prerequisite, permission.

#### **Courses for Graduates Only**

#### **B**STR

501 Hemopolesis (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, radioautogra-phy, 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.

#### CONI

#### **Histochemical and Cytochemical** 505 Methods (3)

(See Conjoint Courses.)

#### **BSTR**

505 Comparative General Histology (3) W Roosen-Runge

Study of biology, histology, and ultrastruc-ture of general tissues in vertebrates and invertebrates. Prerequisite, permission.

#### **BSTR**

#### 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

#### 516 Bioinstrumentation and Research Methods (2-3) W

Luft, Prothero

Introduction to instrumentation, physical and cytological methods employed in medical research generally and biological structure in particular. Emphasis on principles. Prerequisite, permission.

#### BSTR

#### 525 Brain Dissection (2) AWSpS

Everett, Lund, Sundsten Detailed consideration of the macroscopic anatomy of the human brain (individual study). Prerequisite, permission.

#### BSTR

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.

#### BSTR

540 Embryology and Anatomy of Human Cardiovascular System (2) W Blandau

Detailed study of the embryology of the heart and great vessels during the first eight weeks of life. Prerequisites, gross anatomy of thorax and abdomen and permission. (Offered 1974-75 only.)

#### **B**STR

May be repeated for credit. Required of graduate students. Prerequisite, permission.

#### CONJ

585 Surgical Anatomy (1-3, max. 12) (See Conjoint Courses.)

#### **B**STR

600 Independent Study or Research (\*) AWSpS

#### **BSTR**

700 Master's Thesis (\*) AWSpS

**B**STR

800 Doctoral Dissertation (\*) AWSpS

#### **BIOMEDICAL HISTORY**

#### **BI HS**

401 Historical Development of Medical Thought (3) A Bodemer

Survey of the history of medicine from antiquity to the twentieth century, emphasizing concepts and ideas that influenced and were influenced by medicine.

#### **BI HS**

Issues of Life and Death in Historical 403 Perspective (2) 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 re-

production, transplanted and artificial organs, behavior modification; and human experimentation are considered in the context of past and present concepts of life, death, and the individual, and the value judgments that im-pact upon the ethical dilemmas of modern medicine and society.

#### **BI HS**

#### 414 Public Health and Hygiene in Nineteenth-Century America (3) Sp Whorton

Detailed examination of the health problems infectious disease, (including 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 History of Chemical Therapy (3) A Whorton

Survey of the use of drugs to treat illness, from ancient pharmacy to the antibiotics. Emphasis on the historical development of alchemy and chemistry and their influence on the evolution of pharmacy.

#### BI HS

## 417 History of Disease and Public Health (3)

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

Sloan

Survey examining the origins and develop-ment of the biological sciences from antiquity to the twentieth century. Major emphasis on the conceptual foundations of biology in antiquity, the relation of the biological sciences to the scientific revolution of the seventeenth century, and the subsequent diversification of the biological sciences.

#### **BI HS**

#### 420 Biology and the Scientific Revolution (3) Sp Sloan

Detailed analysis of the personalities and the concepts in the development of the biological

557 Seminar (1, max. 9) AWSp

### MEDICINE

sciences in the sixteenth, seventeenth, and early eighteenth centuries. Under consideration are the renaissance in the biological sciences, and the impact of the new mechanistic science of Galileo, Descartes, and Newton on creation of a mechanistic biological science.

#### BI HS

## 421 Biology in the Nineteenth Century (3) W Sloan

General survey of the development of the biological sciences from the 1770's to 1900. Consideration is given both descriptive and experimental biology, with major topics treated, including the impact of intellectual movements on biology, the professionalization of biology, and the consideration of the major scientific developments in biological science.

#### **BI HS**

#### 422 Evolutionary Thought and Society (3) Sp Sloan

General exploration of issues involved in attempts to relate evolutionary biology to current social concerns. Examined through lectures and discussions as they relate to this theme are the writings of such figures as Darwin, Konrad Lorenz, Robert Ardrey, contemporary Marxists, and Teilhard de Chardin.

#### BI HS

#### 424 Philosophical Foundations of the Biomedical Sciences (3) W

Sloan

Introductory course in the general philosophy and methodology of the biological sciences. First portion of the course consists of an introduction to the philosophy of science. The second portion analyzes the application, of these principles to specific methodological issues in the life sciences, treating such topics as the conflict of organismic and reductive biology, philosophical issues in evolutionary theory and taxonomy, and general questions of theory formulation, testing, and scientific explanation in biology.

#### BI HS

430 Medicine and Society in the Age of Reason (3) A

Bodemer

Detailed consideration of medicine and its institutions during the seventeenth and eighteenth centuries. Emphasis on the interacting forces and ideas leading to the development of scientific and humanitarian medicine.

#### BI HS

#### 431 Medicine During the Nineteenth Century (3) W

Bodemer

Detailed consideration of the development of the basic and clinical medical sciences during the nineteenth century, emphasizing medical theory and practice.

#### **BI HS**

#### 432 Madness and Civilization (3) W Bodemer

Survey of attitudes toward madness, concepts of psychopathology, and the treatment of the mentally ill at different periods in the development of Western civilization. Special emphasis placed on the various social, psychological, and cultural factors determining the position of the mentally ill in society.

#### BI HS

#### 433 The Origins of Modern Psychiatry and Its Institutions (3) Sp

Bodemer

Detailed consideration of the nineteenth- and early twentieth-century origins of modern medical psychology, the mental health movement, and mental institutions. Special attention is devoted to the philosophical and 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. Prerequisite, 432 or permission.

#### **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 (\*) AWSpS Investigative work in history of the biomedical sciences. Prerequisite, permission.

#### BI'HS

500 Biomedical Históriography (4, max. 12) AWSp

Emphasis is placed on bibliography and utilization of bibliographic sources. Practice in techniques of organizing and writing history of medicine. Prerequisite, permission.

#### BI HS

#### 505 The Growth of Biological Thought (3) A Bodemer

Survey course intended for, but not limited to, teachers of biology, tracing the development of Western biological thought from the period of classical antiquity to the twentieth century. Particular attention is devoted to the factors influencing the character of biological theories and to the techniques and the effects of biology upon society.

#### **BI HS**

#### 506 Historical and Ethical Aspects of Modern Biology (3) W

Bodemer

Detailed consideration, through lectures, discussion, readings, and student presentations, of selected topics in the historical development of biological thought since the beginning of the nineteenth century. Special consideration is given to the ethical issues arising as a consequence of the advances in the modern biomedical sciences. 505 is highly recommended, but not required.

#### **BI HS**

#### 510 Topics in Biomedical History (3, max. 9) AWSp

Detailed study of topics in biomedical history through lectures, seminars, and discussion. Open to majors and graduate students in medicine, the arts and sciences, and others with appropriate backgrounds and interest. Prerequisite, permission.

#### BI HS

#### 520 Seminar in the History of Medicine (3) Sp

Seminar in the history of medicine and allied sciences, stressing original literature and empha-

sizing independent research by the student. Prerequisite, permission.

#### **BI HS**

#### 521 The Ethical Challenges of Modern Medicine (3) W

Bodemer

Readings and discussion of critical contemporary ethical issues arising from progress in the biomedical sciences and medical technology. The impact of modern biology and medicine upon human values, the relation of medical practices to the moral consensus, and the role and responsibilities of the physician.

#### BI HS

#### 525 Seminar in the History and Philosophy of Biology (3) ASp Sloan

Graduate student seminar on selected issues in the history and philosophy of the biological sciences. A sequence of four seminars explores (1) current issues in the philosophy of biology; (2) biology and the mechanical philosophy of the seventeenth century; (3) selected figures in eighteenth-century biology; (4) Darwinism and nineteenth-century biology; (4) Darwinism 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**

#### CONJ

#### 317-318 Introductory Anatomy and Physiology (6-6) AS,WSp

Landau

Human physiology with anatomical demonstrations. An elementary course integrating gross and microscopic anatomy, physiology, and biochemistry of the human body. Offered conjointly by the departments of Biological Structure and of Physiology and Biophysics. Prerequisites, Chemistry 101 and 102, or equivalent; for nursing and dental hygiene students; others by permission. Coordinator: Department of Physiology and Biophysics.

#### CONJ

#### 400 Human Anatomy and Physiology (6 or 9) A

Skahen

Advanced course integrating anatomy, histology, physiology, and biochemistry of the human body. Designed to meet the needs primarily of graduate students in psychology, physiology and biophysics, and bioengineering, who have no background in histology, anatomy, and physiology. Offered conjointly by the departments of Biological Structure and of Physiology and Biophysics. Prerequisite, permission.

#### CONJ

#### 411 Functional Neuroanatomy (31/2) W Smith, Sundsten

Lecture and laboratory course in neuroanatomy, the sequence being coordinated with Physiology and Biophysics 411, Neurophysiology. Laboratory includes some experience in histological techniques as well as conventional study of gross brain and slide material. Cat and monkey material, as well as human material, is provided. Offered conjointly by the departments of Biological Structure and of Physiology and Biophysics. Prerequisite, permission. Coordinator: Department of Physiology and Biophysics.

#### CONJ

#### 425 Preventive Medicine in Primary Care (2) AWSp

Browder, Cole

Practice of health maintenance is discussed in a seminar format, using the students' patients or other clinical cases from the Family Medical Center as a focus. Presently existing preventive techniques, risk factors, and parameters in-fluencing decisions for clinical intervention are discussed in the course of designing individualized health maintenance programs. Prerequisite, Human Biology 465. Coordinator: Department of Family Medicine. (Formerly 462.)

#### CONJ

#### 444 Medical Aspects of Sexual Problems (1½) W

Hampson

Lecture-discussion format, covering a body of information on sexual behavior, both normal and disturbed, with particular focus on the pertinence to medical practice. Elective open to medical students. Prerequisite, permission. Coordinator: Department of Obstetrics and Gynecology.

#### CONJ

#### 450 **Clinical Infectious Diseases (3) A** Davis, Foy, Holmes

Important infectious diseases in the United States are reviewed by systematic didactic presentation and by case study. Emphasis is placed on etiology, epidemiology, pathogenesis, clinical manifestations, laboratory diagnosis, treatment, and prevention. Permission required for graduate students in microbiology and pharmacology. Graduate students who have not had Human Biology 421 would have considerable difficulty with this course. Coordinator: Department of Pediatrics.

#### CONJ

#### **Clinical Research Center Clerkship** 460 (9 or 18) 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 the University Hospital. Through association with investigators from the clinical faculty, the students become familiar with experimental design and laboratory techniques used in clinical research. Each student is expected to prepare a scholarly treatise on a research problem. In addition, students attend 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. 9 credits allowed for half-time participation, 18 credits for full-time participation. Prerequisites, basic curriculum and permission. (6 or 12 weeks.) Coordinator: Department of Medicine.

#### CONJ

#### Perinatal Clerkship (9) AW 464 Vontver

A full-time program that allows the student to provide family-oriented continuing care through pregnancy, labor, delivery, and the puerperium. Time is spent in each major specialty area, but this is flexible to allow attendance at appropriate scheduled conferences and lectures in each field. Stresses continuity of patient care. Prerequisite, Human Biology 465. Coordinator: Department of Obstetrics and Gynecology.

#### CONJ

#### 473 Musculoskeletal Pathology (2) Sp Clawson, LaZerte

Musculoskeletal pathology with electron mi-croscopic, light microscopic, X-ray, and clinical correlation. Subjects include normal histology and electron microscopy of the MS system, biochemistry and physiology of normal and abnormal specialized connective tissues, embryology of the MS system, repair, infections, and circulatory disturbances. This course is offered in even- and odd-numbered years alternately with Conjoint 474. The courses need not be taken in sequence. Offered conjointly by the departments of Pathology and Orthopae-dics. Prerequisites, Human Biology 465, Orthopaedics 481, or permission. Coordinator: De-partment of Orthopaedics.

#### CONJ

#### Advanced Musculoskeletal Pathology (2) 474 Sp

#### Clawson, LaZerte

Advanced musculoskeletal pathology with electron microscopic, light microscopic, X-ray, and clinical correlation. Subjects include tumors of the musculoskeletal system, benign and malignant, and hamartomas. This course is offered in even- and odd-numbered years alternately with Conjoint 473. The courses need not be taken in sequence. Offered conjointly by the departments of Pathology' and Orthopaedics. Prerequisites, Human Biology 465, Orthopaedics 481, or permission. Coordinator: Department of Orthopaedics.

#### CONJ

#### Clinical Allergy (\*) AWSpS 477 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 interests, emphasizing adult or pediatric allergy with a balanced introduction to the entire field of clinical allergy. Offered con-jointly by the departments of Pediatrics and Medicine. Prerequisite, Pediatrics 465 or Medicine 465 or Family Medicine 465. (4 or 6 weeks, full time.) Coordinator: Department of Medicine.

#### CONJ

#### 503 Somatic Cell Genetics (2, max. 6) A Gartler, 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. (Formerly Pathology 503.)

#### CONJ

#### 505 Histochemical and Cytochemical Methods (3) Sp

#### Broderson, 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. Prerequisites, Human Biology 414, 424 or permission. Coordinator: Department of Biological Structure.

#### CONJ

#### Neurochemistry (3) W 509 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, Neurological Surgery, Biochemistry, Ophthalmology, and Bio-logical Structure. Prerequisite, permission. Coordinator: Department of Physiology and Biophysics. (Offered alternate years; offered 1974-75.)

#### CONJ

#### Animal Models and Comparative 510 Pathology in Biomedical Research (3) W Giddens

History of comparative pathology in the various ways in which naturally occurring animal diseases are used as models in biomedical research. Selected examples of animal models of human disease are reviewed. Students develop and present research plans utilizing animal models within the students' areas of interest. Medical or zoology background in anatomy, physiology, and pathologic processes is desira-ble. Prerequisite, permission. Coordinator: De-partment of Pathology.

#### CONJ

#### 560 **Tumor Biology (3) S**

Champoux, Hakomori, I. Hellstrom, K. E. Hellstrom, Smuckler

Primarily designed for graduate students, but may also be taken by interested medical students. Given as a combination of lectures and conferences. The general areas covered are the basis of carcinogenesis, tumor progression and metastasis, virus-induced tumors, tumor genetics, and tumor immunology. Offered con-jointly by the departments of Microbiology and Pathology. Required of all pathology graduate students. Prerequisite, permission of of Department of Microbiology. Coordinator: Department of Microbiology.

#### CONJ

585 Surgical Anatomy (1-3, max. 12) AWSp Guided dissection of selected regions, supplemented by conferences. Offered conjointly by

the departments of Biological Structure and Surgery. Prerequisite, permission. Coordinator: Department of Biological Structure.

### FAMILY MEDICINE

#### FAMED

#### 420-421-422 Ambulatory Care in Family Practice (11/2-11/2-11/2) A,W,Sp Baker

In the University or an affiliated teaching family practice unit, the student works up and follows a small group of families for whom he and the faculty preceptor are responsible for comprehensive care. The student's cases are the subject of the coordinated electives dealing with health maintenance, interview technique, and special topics in primary care. Prerequisite, basic hospital clerkship. (Limit: fifteen students.) (Formerly 464.)

#### FAMED

#### 423-424 Seminar: Topics in Family Medicine (1-1) AWSp

Baker Major topics in primary care that arise in the course of treating patients in 464 are discussed. These include issues in patient care, office management, and counseling. Prerequisite, basic hospital clerkship. (Limit: fifteen students.)

#### FAMED

#### 461 Interviewing for Comprehensive Care (1) WSp

Baker

Comprehensive care to patients; identification of problems accurately and completely, to include somatic, emotional, and social realms; assessment of "who" the person is in order to determine and solve his problems most effectively. Focus is on interviewing patients when these are the goals. Prerequisite, Human Biology 465. (Limit: fifteen students.)

#### FAMED

#### 465 Community Clinical Clerkship in Family Medicine (9) AWSpS Wiegert

Stresses the common and important clinical problems in family practice. Student functions as clinical clerk in a community clinical unit of the Department of Family Medicine, where he participates in care of assigned patients, using office, hospital, home, and community resources. Prerequisites, Human Biology 465 and Medicine 465 or permission. (6 weeks, full time.)

#### FAMED

#### 475 Advanced Preceptorship in Family Medicine (\*) AWSpS, Phillips

An opportunity for the student to apply and extend his clinical skills by working with a selected family physician in an active practice. The preceptor and the location are chosen to fit individual student's interests. Opportunities are available throughout Washington and in adjoining states. Student must have completed several general clinical clerkships previously (e.g., Medicine 465, Pediatrics 465, Surgery 465, etc.). Prerequisite, Human Biology 465.

### HUMAN BIOLOGY

This sequence is required for all medical students. Other students may enroll by permission of the Assistant Dean for Curriculum, School of Medicine.

#### **HUBIO**

#### 400 Medical Practice Preceptorship at WAMI Sites (1) A

Provides opportunity for first-year medical students to gain personal experience with, and insight into, medical practice situations. During this introductory period, the student is stationed with carefully selected clinical faculty members in their offices in accordance with the student's preference of discipline at the WAMI sites.

#### HUBIO

411 Anatomy (4) A Eddy

Development of the embryo from fertilization and implantation to full organ and 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**

#### 412 Mechanisms in Physiology and Pharmacology (4) A

Davis, 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**

#### 413 Introduction to Clinical Medicine (1) A Baker

Instruction in communication skills and interview techniques to form the basis for the eventual doctor-patient relationship and for the skill of communicating with patients. The patient profile is obtained, and the concept of problem identification is introduced.

#### HUBIO

#### 414 Molecular and Cellular Biology I (3½) A Bornstein

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

415 The Ages of Man (2) A Shepard

Physical and psychological development of the whole individual from birth through old age, including neonatal adaptation, nutrition, and developmental milestones in childhood and adolescence, degenerative problems of senescence.

#### HUBIO

#### 420 Cell and Tissue Response to Injury (4) W Smuckler

Patterns of cell and tissue response to injury. Immunity and immune responses. Hypersensitivity, homograft reaction and autoimmune response. Immunohematology. Morphological, functional, and kinetic aspects of leucocytes and immunocytes. Principles of neoplasia.

#### **HUBIO**

#### 421 Natural History of Infectious Diseases and Chemotherapy (4½) W Sherris

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, nosocomial and iatrogenic infections and their prevention.

#### HUBIO

#### 422 Introduction to Clinical Medicine (1½) W

Baker

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

#### 423 System of Human Behavior I (2) W Bakker

Overview of conceptual systems and models of behavior, normality and abnormality, environment and social learning, conditioning, learning, conditioning, learning in the autonomic nervous system, catecholamines and behavior, illness behavior, feelings, emotion and cognition, physician-patient interaction and disease and techniques of behavior change."

#### HUBIO

#### 424 Molecular and Cellular Biology II (2½) W

Bornstein Continuation of 414.

#### illinuation of 4

HUBIO

#### 430 Epidemiology (11/2) 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

431 Head, Neck, Ear, Nose, and Throat (2½) Sp

Schwarz

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

#### 432 Nervous System (5½) Sp Crill

Integrated approach to: normal structure and function of the nervous system, including the eye. Basic neuropathology and diseases of the eye. Neuropharmacology with emphasis on modes of action and classes of drugs. Clinical evaluation of the nervous system and eye with illustrative examples of the manifestations of specific and important neurological lesions, and common and rare, but important and reversible, conditions.

#### HUBIO

#### Medicine, Health, and Society (11/2) Sp 433 Gilson

Social and cultural determinants of health and disease. Interrelationships of patient, physician, family, and community. Health as the physical, mental, and social well-being of the individual.

#### HUBIO 434 Endocrine System (2) Sp

Wood

Gross and microscopic anatomy of the endocrine system. Principles of endocrine physiology as illustrated by model systems (extending the concepts of homeostasis, control and feedback systems previously learned), hormonal biosynthesis and important pathophysiologic states. The endocrine integration of metabolism.

#### HUBIO

#### 435 Introduction to Clinical Medicine (11/2) Sp

Baker

Screening physical examination is taught. Further experience and instruction in the medical history are offered. The problem-oriented write-up is an additional objective of this course.

#### HUBIO

#### 440 . Cardiovascular-Respiratory System (6) A Scher

Anatomy of heart, vessels, and lungs; phys-iology of heart, circulation, respiration (including gas transport); major pathological disorders of the heart, great vessels, and lungs; physical examination of the chest and cardiovascular system.

#### HUBIO

#### 441 Gastro-Intestinal System (31/2) A Rubin

Anatomy of the gastrointestinal system; physiology and pathology of digestion and hepatic function; and physical and laboratory examination.

#### HUBIO

442 Introduction to Clinical Medicine (11/2) A Goodell

Advanced instruction in interview technique, history taking, and physical examination, with emphasis on detection of abnormalities.

#### HUBIO

#### Medicine, Health, and Society (2) A 443 Gilson

medicine and environmental Community health.Organizational aspects of medical care and public health. Socioeconomic factors in health care delivery and environmental health.

#### HUBIO

Genetics (1/2) A 449 Fialkow

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 multifac-torial; 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.

#### HUBÌO

#### Introduction to Clinical Medicine (31/2) W 450 Goodell

Continuation of 442 with emphasis on identification of problems and correlation of findings with pathophysiological mechanisms.

#### HUBIO

Hematology (3) W 451 Hillman

Familiarizes students with the basic patho-

physiologic mechanisms leading to disturbances of red cell, white cell, and platelet production, as well as abnormalities of hemostasis presenting clinical problems. Physiology, rather than minute details of individual disease, is stressed.

#### HUBIO

#### 452 Urinary System (4) W

Chapman

Physiology, pathology, and examination, in-cluding radiology, of the lower urinary tract; kidney microscopic anatomy; physiology of the kidney, including fluid and diuretic therapy; pathology, microbiology, and immunology of renal disease with clinical examples; physical and laboratory examination.

#### HUBIO

#### 453 Musculoskeletal System (31/2) W Rosse

Gross, surface, applied, and X-ray anatomy of system, including entire spine but excluding head and neck. Histology of bone, cartilage, tendon-myotendinal junction and joints. Musculoskeletal trauma and healing. Pathology and clinical manifestations of other degenerative, inflammatory, metabolic, nutritional, and congenital disorders. Physical examination.

#### HUBIO

#### 460 Introduction of Clinical Medicine (5) Sp Goodell

Continuation of 450. Introduction to clinical and laboratory diagnosis.

#### HUBIO

#### 461 Skin System (11/2) 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**

Reproductive Biology (3) Sp 462 Gibson

The microscopic anatomy, physiology (including endocrine physiology), pathology, and physical diagnosis of the reproductive system; gametogenesis; gamete transport, fertilization, implantation, placental development, ovulation and its control, menarche and menstruation, the physiology of pregnancy and labor, the gynecologic examination, and gynecologic pathology.

#### HUBIO

#### 463 System of Human Behavior II (2) Sp Carr, Scher

Provides the student with a basic knowledge of clinical psychopathology, its etiology, objective clinical description, and methods of treatment. Students obtain a working knowledge of the cognitive, affective, biologic, and social factors that determine and contribute to behavioral disorders and diseased states; the processes of diagnosis and problem definition and selection of appropriate modes of intervention and behavioral change.

#### **HUBIO**

#### 465 Basic Hospital Clerkship (71/2) Sp

Hillman Hospital routine and staff interrelationships; developing basic skills in history taking, physical and laboratory examination, and diagnostic synthesis) acquainting the student with specific, but limited, variety of clinical problems; fundamentals of clinical pharmacology and therapeutics.

#### **HUBIO**

#### 491 Independent Study of Medicine (15, max. 90) AWSpS

Cutler, Striker

The independent study program encompasses the human biology series of the School of Medicine curriculum. The program features self-study and a tutorial evaluation system, depending on self-study rather than on a lecture system to cover the course content. Prerequisites, medical student standing and permission. (Last time offered: Summer Quarter 1975.)

#### LABORATORY MEDICINE

#### LABM

320 Introduction to Clinical Coagulation (3) A Behrens

Lecture and laboratory covering the theory and pathology of coagulation with inclusion of selected diagnostic procedures. Prerequisite, permission.

#### 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) Sp LeCrone, Szabo

Lecture and laboratory covering the theoretical

and practical concepts associated with testing procedures performed in clinical chemistry. Prerequisite, permission.

#### LAB M

#### 401 Clinical Laboratory Diagnosis (3) W Heywood, Ray

Orientation to role of clinical laboratory in diagnostic medicine. Emphasis on appropriate test selection, interpretation, principles, problems, and limitations. Lecture-discussion with illustrative case presentations and demonstrations. Prerequisites, Human Biology 413, 422, 435, 442, 450, 465, or permission.

#### LAB M

### 420 Clinical Microscopy (3) S

Hamernyik

Lecture and laboratory covering urinalysis testing procedures and associated disease entities. Prerequisite, permission.

#### LAB M

421 Medical Microbiology (5) S

McGonagle

One-quarter lecture and laboratory designed to prepare medical technology students for further training in a clinical microbiology laboratory. Prerequisite, permission.

#### LAB M

#### 422 Medical Technology: Seminar (5) S Behrens, Szabo, Staff

Advanced didactic coverage of topics relating to the theoretical and practical concepts of laboratory medicine. Prerequisite, permission.

#### LAB M

#### 423 Clinical Chemistry (11) AW Szabo, Staff

Clinical testing related to protein and amino acid determinations, pancreatic functions and intestinal absorption, renal and liver function, enzymes, electrolytes, and acid-base balance, lipids, toxicology, and endocrinology. Prerequisite, permission.

#### LAB M

#### 424 Clinical Microbiology (9) AW McGonagle, Staff

Clinical review of general techniques, study of clinically significant bacteria, including specific methods of specimen examination, fluorescence microscopy, and testing for antibiotic susceptibility. Prerequisite, permission.

#### LAB M

#### 425 Clinical Hematology (7) AW Behrens, Staff

Clinical coverage of automated and manual cell counting, cellular morphology, and testing procedures related to red and white cell disorders. Prerequisite, permission.

#### LAB M

#### **Clinical Immunohematology (5) AW** 426 Hamernyik, Staff

Clinical study of immunohematology of the red cells and hemagglutination techniques.

#### LAB M

#### 427 Selected Studies in Laboratory Medicine (15) Sp

Behrens, Hamernyik, LeCrone,

McGonagle, Szabo

Selected study in either one of the major disciplines of laboratory medicine, in all major disciplines of this field; or pursuance of a clinical research problem. Prerequisite, permission.

#### LAB M

#### 477 Clinical Electroencephalography (\*) AWSp8

Chatrian, Wilkus

For students who desire to acquire familiarity with the techniques, interpretive criteria, and clinical applications of electroencephalography. Prerequisites for medical students, Human Biology 432 and permission; others by permission. (2 or 4 weeks). (Formerly Neurological Surgery 477.)

#### **MEDICAL PRACTICE**

#### MED P

#### 401 Medical Practice Preceptorship (1) AWSpS

Provides opportunity for first- and second-year medical students to gain personal experience with, and insight into, the medical practice situations. The student is stationed with clinical faculty members in their offices to observe and participate in the care of their patients, and to gain insight into the management aspects of the clinical practice of the student's preference of discipline (i.e., medicine, family, pediatrics, etc.). (One-half day each week for ten weeks, by arrangement.)

#### MED P

#### 402 Medical Practice Management (1)

Seminar directed toward students in clinical clerkships that deals with the management aspects of medical practice: setting up of an office, partnership arrangements, incor-poration, trusts, wills, insurance programs, and personal finances are the subjects of dis-

cussion. Guest faculty is drawn primarily from professionals in the practice of law, investment counseling, estate managements, as well as physicians in various types of medical practice. Prerequisite, third- or fourth-year medical student standing.

#### MEDICINE

#### MED

#### 404 Clinical Preceptorship in Internal Medicine-Bremerton (6) AWSp Hamon

Working closely with primary-care physicians, the student is exposed to the private practice of internal medicine in a small community. Operating on a one-to-one basis with an internist (tutor), the student evaluates and manages inpatients and outpatients on a primary care, consultative, and emergency basis. In addition to varied subspecialty exposure through his tutors, the student has supple-mental teaching sessions. The student assumes responsibility for all aspects of patient care in parallel with his interest and ability. Pre-requisite, 465. (4 weeks, full time.)

#### MED

#### 431 Human Genetics (\*) AWSp

Fialkow, Motulsky

Weekly seminar dealing with a variety of topics in medical genetics given by staff of the Division of Medical Genetics and related departments and divisions. Opén to medical students with a good foundation in genetics.

#### MED

#### 432 Applied Blood Group Genetics (2) Sp Giblett

Lecture and laboratory work including individual projects that are related to blood transfusion, immune hemolysis, and inheritance. Prerequisites, Human Biology 434 and 465.

#### MED

#### 433 Major Considerations in Clinical Endocrinology (2) Sp

Williams

Emphasis on the most major and dependable symptoms, signs, laboratory tests, and therapy for clinical endocrinopathies. Patient illustrated.

#### MED

#### Dermatology Clinic (\*) AWSpS 440 Odland

Students attend dermatology clinic on Monday mornings and Thursday afternoons for twelve weeks. Prerequisite, Human Biology 465.

#### MED

#### Clinical Gastroenterology (6) AWSp

Fenster (Virginia Mason Hospital and Mason Clinic)

Combined inpatient-outpatient elective in clini-cal gastroenterology, which includes practical experience in GI endoscopy and liver biopsy. Directed tutorial work. Special arrangements can be made for students with special interests. Prerequisite, 465. (4 weeks, full time.)

#### MED

#### Clinical Oncology (\*) AWSpS 442 Thomas (Providence Hospital)

Students are responsible for the work-ups and daily care of patients receiving marrow transplants, high-dose chemotherapy or immunotherapy on an intensive-care research ward. Emphasis is on the management and supportive care of patients with pancytopenia and immunosuppression, transplantation biology, cancer chemotherapy, and infectious

disease problems. Experience in clinical oncology and hematology is a part of the 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, 465. (4, 6, or 12 weeks, full time.)

#### MED

#### 447 Clinical Pharmacology and Therapeutics (1) AWSpS

#### Aagaard, Holcenberg

Seminar that reviews significant and timely therapeutic problems in the field of internal medicine. Prerequisite, Human Biology 465.

#### MED

448 Genetics, Medicine, and Society (1) WSp

Fialkow, Motulsky Students and faculty discuss in lectures and seminars the aspects of genetics relevant to medicine and society. Prerequisite, Human Biology 449.

#### MED

#### Application of Genetic Principles to Medicine (4½) WSp 449

Fialkow, Motulsky, Onenn Ward rounds, clinic, and seminar discussions of patients and topics in clinical genetics. Students attend medical genetics clinic Tuesdays, examine families and obtain pedigrees under supervision, and attend genetics rounds on the wards Thursdays. Prerequisites, Human Biology 449, 462.

#### MED

465 Clinical Clerkships (\*, max. 18) AWSpS Beaty, Griep, Pope, Turck, Van Arsdel Hospital patients are assigned to each student for a complete work-up. Ward rounds are held daily; lectures, clinics, and conferences weekly. Prerequisite, Human Biology 465. (6 or 12 weeks, full time.)

#### MED

#### 466 Clinical Preceptorship in Internal Medicine-WAMI (9) 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, 465. (6 weeks, full time. Limit: six students.)

#### MED

#### **Clinical Dermatology (6) AWSpS** 478 **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 Hos-pital and Medical Center. Journal club and clinical conferences each week with entire staff. A continuing series of teaching seminars and weekly dermatopathology conferences. Pre-requisite, Human Biology 465. (4 weeks.)

#### MEĎ

#### Clinical Gastroenterology (\*) AWSpS 479 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, Human Biology 465. (4 or 6 weeks, full time.)

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#### MED

#### 480 Rheumatology (6) AWSp Mannik

Full-time inpatient-outpatient clerkship in rheumatology. Clinical experience provided in diagnosis and treatment of rheumatic diseases, utilizing outpatient clinics and hospitalized patients at the University Hospital and the Harborview Medical Center. Emphasis on concepts in pathophysiology, diagnosis, and treatment of these diseases. In addition to patient contact, reading, seminars, and preceptorial sessions are the methods of instruction. This course is offered each quarter except Summer Quarter. Prerequisite, 465 or Human Biology 465 or Pediatrics 465 or Family Medicine 465.

#### MED

#### 481 Advanced Clinical Endocrinology (\*) AWSpS

Paulsen (United States Public Health Service Hospital)

Full-time inpatient-outpatient clerkship in clinical endocrinology at United States Public Health Service Hospital. Library review on selected topics in the field and participation in medical clinical research problems optional during this clerkship. Prerequisite, Human Biology 465. (4, 6, or 12 weeks.)

#### MED

#### 482 **Clinical Cardiology and** Electrocardiography (6) AWSpS

Blackmon (University Hospital), Preston (Harborview Medical Center), Kennedy (Veterans Administration Hospital), McDonough, Wills (United States Public

Health Service Hospital)

Clerkship in clinical cardiology-combined inpatient-outpatient assignments, ECG inter-pretation. At Harborview Medical Center and Veterans Administration Hospital special emphasis is placed on operation of an acute cardiac care unit. Prerequisite, 465. (4 weeks.)

#### MED

483 **Clinical Respiratory Disease and** Pulmonary Physiology (6 or 9) AWSpS Butler (University Hospital), Hudson (Harborview Medical Center), Sullivan (Veterans Administration Hospital). Dohner (United States Public Health Service Hospital)

Training in respiratory disease diagnosis and pulmonary therapy, with special emphasis on cardiopulmonary function testing and inter-pretation. Inpatient and outpatient teaching rounds, conferences, and basic science inte-mation Paragonistic Human Pictory 465 gration. Prerequisite, Human Biology 465. (4 weeks.)

#### MED

#### 484 Clinical Hematology or Oncology (\*) AWSpS-

Finch (University Hospital), Harker (Harborview Medical Center), Adamson (Veterans Administration Hospital), Huff (Virginia Mason Clinic), Wright (Swedish Hospital)

(a) University Hospital-4 weeks, AWSpS (b) Harborview Medical Center-4 weeks, AWSDS

(c) Veterans Administration Hospital-4 weeks, AWSpS

(d) Virginia Mason Clinic-4 weeks, AW (e) Swedish Hospital-4 weeks, AW Outpatient and inpatient experience with hematologic or oncologic disorders. The elective includes teaching rounds, conferences, and evaluation of laboratory work. Prerequisite, 465.

#### MED

#### 485 Clinical Genetics (\*) AWSpS Fialkow. Motulsky

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, Human Biology 465. (6 weeks.)

#### MED

Advanced Clinical Neurology (\*) AWSpS 486 P. Swanson (University Hospital)

Inpatient and outpatient experience in clinical neurology at the University Hospital, Veterans Administration Hospital, or Harborview Medical Center. Students work closely with staff, attend clinical conferences, present patients on attending rounds, participate in seminars on topics in clinical neurology, and become more familiar with diagnostic neurological procedures. In addition, students attend one clinic per week. For students taking a linear quarter, an exclusively outpatient experience can be arranged. Prerequisite, 465. (4 weeks.)

#### MED

#### 487 Ambulatory Medicine Elective (\*) AWSpS

Zimmermann (University Hospital), Clark (Harborview Medical Center)

Students acquire knowledge and skill in dealing with ambulatory patients with problems commonly encountered in the office practice of 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 may elect to spend from two to five half-days each week in the general internal medicine clinics either at University Hospital (morning clinics) or at Harborview Medical Center (afternoon clinics). Prerequisite, 465 or Family Medicine 465. (12 weeks.)

#### MED

#### Ward Medicine Subinternship (\*) AWSpS Turck (Harborview Medical Center), 488 Evans (Veterans Administration Hospital), Griep (United States Public Health Service 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, 465. (6 or 12 weeks.)

#### MED

#### 489 Clinical Infectious Diseases (\*) AWSpS

Kirby (University Hospital) Students participate in the consulting service throughout the hospital, attend daily plate rounds, conferencés, and seminars. Prerequi-site, 465. (2, 4, or 6 weeks.)

> Turck (Harborview Medical Center), Holmes (United States Public Health Service Hospital)

Students participate in the consulting service throughout the hospital. They are given the opportunity to learn the microbiological as-pects of infectious diseases through the clinical laboratories. Prerequisite, 465. (4 weeks.)

#### MED

#### Cardiology Subinternship (\*) AWSpS 490 Blackmon

Students act in the capacity of interns on the white service under the supervision of house officer. Prerequisite, 465. (4 weeks.)

#### MED

#### 492 Clinical Endocrinology and Metabolism (\*) AWSpS

Goodner (Harborview Medical Center), Lavis (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, Human Biology 465. (4 or 6 weeks.)

#### MED

#### 493 Nephrology and Fluid Balance (\*) AWSpS

Scribner

Nephrology/fluid balance clerkship at University Hospital, Harborview Medical Center, Veterans Administration Hospital, and the Virginia Mason Clinic. Students see clinical nephrologic problems under close supervision, participate in nephrology and transplant rounds, see consults with renal fellow and attending, and work up patients in renal clinics. Students also attend a series of seminars throughout the clerkship in which clerks at all four hospitals participate. Prerequisite, 465. (4 weeks.)

#### MED

#### Metabolism and Diabetes (3 or 6) AWSp 494 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. Prerequisite, 465. (2 or 4 weeks, full time.)

#### MED

#### Clinical Aspects of Aging (11/2) AWSp 495 Bierman, Hazzard

On-the-scene training and experience in the special medical and social problems of old age are offered in a variety of actual community situations ranging from public hospitals to private nursing and retirement homes. Local physicians devoted to delivery of health care to this group with its special problems are used as preceptors. This is an opportunity for the student to incisively examine one's own approach to chronic illness and to the dying patient. Students work up and follow individual diagnostic, therapeutic, and social problems. Pre-requisite, 465 or Human Biology 465. (12 weeks, 1 morning per week.)

#### MED

#### 497 Medicine Special Electives (\*) 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. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisite, permission. (6 or 12 weeks.)
#### MED

**498 Undergraduate Thesis (\*) AWSpS** For medical students. Prerequisite, permission.

#### MED

**499** Undergraduate Research (\*) AWSpS Case studies, with laboratory research. For medical students. Prerequisite, permission.

# MICROBIOLOGY

#### MICRO

101 The Microbial World (5) W Lara

For majors in the social sciences and humanities but open to science majors other than biologists. Using the nature and activities of bacteria and viruses as the focus of interest, a view 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 physical and biological sciences with micro-organisms and their activities. The understanding of basic biological concepts elucidated through investigations of micro-organisms emphasized. Topics include microbial cell structure and function, metabolism, microbial genetics, and the role of microorganisms in disease, immunity, and other selected applied areas. Prerequisite, two quarters of chemistry. A course in a biological science is desirable but not required.

#### MICRO

#### 302 General Microbiology Laboratory (2) AWSpS

Laxson, Nester

Laboratory course primarily for students taking 301. The laboratory exercises cover a variety of microbiological techniques, with experiments designed to illustrate major concepts of microbiology, virology, and immunology. Prerequisite, concurrent or previous registration in 301 or permission.

#### MICRO

#### 4319 Laboratory Techniques in Microbiology (1) AWSp

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 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 in G313A Health Sciences necessary. Applicants are selected by interview. (Limit: three students.)

#### MICRO

### 351 Introduction to Medical Microbiology (3) Sp

Evans

One-quarter course designed for students who have a background in biology and whose goal is a career in one of the medical or associated sciences. Focus on the microbiology of medically important organisms, epidemiology, mechanisms of pathogenicity, and immune host response. Provides a background of understanding that will be supplemented during subsequent professional training. Students who need a laboratory to fulfill their degree requirements should register concurrently in 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, Biology 211 or equivalent.

#### MICRO

400 Fundamentals of Bacteriology (3) ASp Douglas, Lara, Ordal

Basic bacteriology; comparative morphology, taxonomy, physiology of bacteria. For students majoring in microbiology and others interested chiefly in the biological and chemical aspects of microbes. Required for students majoring in microbiology. Recommended for graduate students in biochemistry or biology. Prerequisites, 6 credits in organic chemistry; Biology 210, 211, and 212, or 10 credits in botany or zoology.

#### MICRO

#### 401 Fundamentals of Bacteriology Laboratory (3) ASp

Douglas, Lara, Ordal, Portman

Laboratory course 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; Biology 210, 211 and 212, or 10 credits in botany or zoology.

# MICRO

#### 430 Microbial Metabolism (3) W Douglas, Whiteley

The major patterns of fermentative and oxidative metabolism of yeasts and bacteria. For students majoring in microbiology or food science. Prerequisite, 400 or 301.

#### MICRO

#### 431 Microbial Metabolism Laboratory (2) W Douglas, Portman

Exercises include tests for carbon compound utilization, nutritional requirements, quantitative determinations of fermentation products, isolation of mutants, and assays of enzymes in cell-free extracts. Prerequisite, concurrent registration in 430.

#### MICRO

#### 435 Microbial Ecology (3) A Staley

Consideration of the various roles that microorganisms, particularly bacteria and bluegreens, play in 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. Prerequisites, concurrent registration in 435 and permission. (Limit: ten students.)

#### MICRO

# 441, 442 Medical Bacteriology, Virology, and Immunology (3,3) A,W

Evans, Falkow, Weiser

441: brief survey of general bacteriology, immunology, and virology. During the last part of 441 and throughout 442 specific 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 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 microorganisms and testing of their susceptibility to antibiotics. Selected reading assignments and a one-hour demonstration period each week. Prerequisites, enrollment in 441, 442 sequence or Human Biology 421, and permission.

#### MICRO

#### 444 Medical Mycology and Parasitology (4) Sp Coyle, Cramer, Plorde

Consideration of medically important fungi and parasites, with emphasis on their biology in relation to disease and its laboratory diagnosis. For medical technology students, microbiology majors, and medical students as an elective. Prerequisites, 10 credits in basic biology and 6 credits in organic chemistry, and permission.

#### MICRO

#### 447 Fundamentals of Immunology (4) Sp Hellstrom, Pearsall, Weiser

Broad coverage in immunology with stress on fundamentals. For students in specialized areas of medicine and dentistry and various undergraduates and graduates with interests in areas requiring substantial knowledge in immunology. Occurrence and properties of antigens and 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; 5 credits of organic chemistry, and upper-division standing; for medical students, Human Biology 421.

#### MICRO

# 450 Molecular Biology of Viruses (3) Sp

Champoux, Kiehn Introduction to the molecular biology of viruses and virus-host relationships. Designed for advanced undergraduates and graduate students in the biological sciences. Coverage

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includes bacterial and animal viruses, the nature of infection, the variety of virus-host relationships and discussion of some models of viral pathogenesis. Prerequisite, knowledge of biochemistry and molecular biology at the level of Biology 211 or introductory biochemistry courses or Watson's Molecular Biology of the Gene.

# MICRO

# 495 Honors Undergraduate Research (\*) AWSpS

Groman

Specific problems in medical and general microbiology. 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, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form and contact the Chairman of the Department of Microbiology at least one month before preregistration. Limited to medical students. Prerequisite, permission.

#### MICRO

498 Undergraduate Thesis (\*) AWSpS

For medical students. Prerequisite, permission.

#### MICRO

#### 499 Undergraduate Laboratory Research (\*) AWSpS

Specific problems in medical and general microbiology. Prerequisite, permission; senior standing desirable.

# **Courses for Graduates Only**

MICRO

#### 501 Research Techniques in Virology (\*, max. 5) A

Groman

Introduction to the basic experimental techniques in virology. Prerequisite, permission.

#### MICRO

#### 502 Research Techniques in the Study of Microbial Enzymes (\*, max. 5) W Whiteley

Cultivation of large quantities of bacteria; purification of proteins, enzyme kinetics; sedimentation properties; control of enzyme activity and synthesis; localization of enzymes in bacterial structures. Prerequisites, 400, Biochemistry 440, 441, 442, and permission.

## MICRO

#### 503 Research Techniques in the Study of Nucleic Acids (\*, max. 5) W Champoux, Whiteley

Techniques used in the isolation and characterization of nucleic acids. Prerequisite, permission.

#### MICRO

504 Research Techniques in Microbial Genetics (\*, max. 5) A

# Nester

The isolation and characterization of mutants by biochemical and genetic techniques. Prerequisite, permission.

#### MICRO

505 Immunological Techniques (\*, max. 5) Sp Storb

Theory and use of current immunological techniques. Prerequisite, permission.

#### MICRO

#### 506 Techniques in Electron Microscopy of Micro-organisms (3) Sp Lara

Techniques used in the preparation of microorganisms for electron microscopy, the operation of the electron microscope, and the photographic reproduction of observations. Prerequisites, major in a biological science and permission.

#### MICRO

# 510 Physiology of Bacteria (3) Sp Whiteley

Fundamentals of physiological and metabolic processes of bacteria with emphasis on the synthesis of cellular constituents, mechanisms, and energy-yielding processes. Prerequisites, 400 and Biochemistry 440, 441, 442, or permission. (Offered alternate years; offered 1974-75.)

#### MICRO

520 Seminar (1) AWSp

May be repeated for credit.

#### MICRO

#### 525 Cell Sufface 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 the Department of Pathobiology as Pathobiology 525. Prerequisites, 447, Biochemistry 440, 441, 442, and permission.

#### MICRO

#### 530 Advanced General Microbiology (4) W Ordal

Enrichment, isolation, and comparative morphology and physiology of selected bacteria. Open to qualified undergraduates. Prerequisites, 400 and 401, or equivalent, and permission.

## MICRO

540 Virology (3) Sp

Champoux, Kiehn Prerequisite, permission. (Offered alternate years; offered 1975-76.)

#### MICRO

#### 550 Selected Topics in Immunology (2, max. 18) AWSp

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 Human Biology 421, Pathology 444 or Human Biology 420, Biochemistry 405 or Human Biology 421 and permission. (Offered alternate years; offered 1975-76.)

#### MICRO

#### 555 Advanced Clinical Microbiology (2½) AWSp

Coyle, Schoenknecht, 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, Schoenknecht

Training in clinical microbiology and research. Attendance at daily laboratory rounds in addition to bench-side training and research. For medical students and microbiology graduate students only. Prerequisites, 443 and permission.

#### CONJ

#### 560 Tumor Biology (3) S (See Conjoint Courses.)

#### MICRO

599 Topics in Microbiology (\*, max. 6) AWSpS Sherris

Current problems in microbiological research. Prerequisite, permission.

#### MICRO

#### 600 Independent Study or Research (\*) AWSpS

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#### MICRO 700 Master's Thesis (\*) AWSpS

MICRO

800 Doctoral Dissertation (\*)

# **NEUROLOGICAL SURGERY**

### NR /

428 Neurological Surgery Seminar (1) AWSpS

Calvin

Weekly seminar centered around neurological research topics with discussion by staff and students. Prerequisite, Human Biology 432 or permission.

#### NR

#### 441 Neurosurgery for the Generalist and Clinical Specialist (2) W

Kelly, 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 and disk disease, hydrocephalus, lesions. chronic pain are covered in depth. This course is not intended for those students planning to take 479 or 480. Prerequisite, Human Biology 432; detailed information about any of the neurosciences is not required.

## NR

#### **Clinical and Basic Research Correlates of** 442 Epilepsy (2) A

Fetz, Ojemann, Westrum

Clinical symptoms and treatment of epilepsy; related basic research in neuroanatomy, neurophysiology, neuropsychology, and neuropharmacology of epilepsy. Prerequisite, Human Biology 432 for medical students; permission for others.

#### NR

#### 479 Clinical Neurological Surgery (\*) AWSpS Oiemann

Student serves clinical clerkship as active extern on neurological surgery ward at University Hospital or University-affiliated hospital. Prerequisite, Human Biology 465. (2 weeks.)

#### NR

#### 480 Neurological Surgery Clerkship (\*) AWSpS.

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 479, if student wishes. Prerequisite, Human Biology 465. (4 weeks.)

#### NR

#### Seizure Clinic Clerkship (2) AWSpS 481 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, Medicine 465 and permission.

#### NR

#### 497 **Neurological Surgery Special Electives** (\*) 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.

# NR

Undergraduate Thesis (\*) AWSpS 498 Oiemann

Prerequisite, permission.

#### NR

#### 499 Undergraduate Research (\*) AWSpS 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.

# **OBSTETRICS AND** GYNECOLOGY

#### **OB GY**

465 Introduction to Obstetrics and Gynecology (\*) AWSpS

Gibson

Clinical clerkship in obstetrics and gynecology that complements Human Biology 462. Directed at the third- and fourth-year-level students and includes private office experience, lecture seminars, delivery and operating experience, and some preceptorial sessions. The clerkship is offered six times each year, and each class is limited to seventeen students. Prerequisite, Human Biology 462. (4 weeks.)

#### **OB GY**

#### 466 Community Clinical Clerkship in Boise, Idaho (\*) AWSpS Gibson

May be taken in lieu of 465 with departmental approval, and for less than six weeks (two or four) if the student has passed 465. The student spends six weeks as a clinical clerk on obstetrics and gynecology at a clinical unit in Idaho. The student actively participates in obstetric deliveries and closely follows the management of obstetric patients. He does histories and physical examinations on surgical patients and attends their surgery. Hospital rounds are made on both obstetric and gynecologic patients. In addition, the student spends time in the local physician's office (there are several physicians) and is afforded a varied experience in the office practice of the specialty. Prerequisites, 465, Human Biology 462 (for those choosing two- or fourweek clerkships).

#### **OB GY**

# 479 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**

#### 480 Clinical Clerkships (\*) AWSpS Gibson

University Hospital (two students), Madigan Army Hospital (two students; starting August, 1974, students must register for at least four weeks), Harborview Medical Center (two stu-dents, gynecology only), Virginia Mason Clinic (one student, office orientation). The student spends two or more weeks as a clinical clerk on obstetrics and/or gynecology at one of the above hospitals. On the obstetrical service, the student actively participates in the deliveries and closely follows the management of all obstetric patients. In addition, he is assigned to the obstetric and gynecologic outpatient clinics that afford him the opportunity to learn the office problems of the specialty. Some changes in assignments at various hospitals are made as services offered at these hospitals change. Prerequisite, 465 or Conjoint 464.

#### **OB GY**

#### 484 Endocrinology of Reproduction (\*) AWSpS

#### Herrmann

The biochemistry of steroids. Steroid metabolism as related to clinical problems. Diagnosis and treatment of endocrine disorders. Case studies with special emphasis on modern methods of investigation. By special arrangement with instructor.

#### **OB GY**

# 497 Obstetrics and Gynecology Special Electives (\*) AWSpS

Gibson

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect. this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisites, 465 and permission.

#### **OB GY**

#### 498 Undergraduate Thesis (\*) AWSpS Gibson

By arrangement.

#### **OB GY**

499 Undergraduate Research (\*) AWSpS Heinrichs

Prerequisite, permission.

# **OPHTHALMOLOGY**

#### **OPHTH**

424 Special Topics in Vision (3) ASp Hendrickson

Seminar covering special topics concerned with recent research in the anatomy, the biochemistry, and the physiology of vision. Prerequisite, permission.

# **OPHTH**

#### 481 Ophthalmology Clinical Elective (6) AWSp

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, Human Biology 465 and concurrent registration in 484. (4 weeks. Limit: one student.)

#### **OPHTH**

#### 482 Ophthalmology Externship (3) AWSpS Kramar

Student works with a faculty member in the diagnosis and treatment of ocular disease in both outpatient and inpatient populations. Experience in common ocular disorders is gained, and neurological and other consultations seen. Prerequisite, Human Biology 465. (Limit: one student.)

#### OPHTH

#### 483 Pediatric Ophthalmology (11/2) AWSp Kalina

Student observes and examines children with ocular diseases. He observes treatment and learns to differentiate trivial from potentially blinding disorders. A programmed text in general ophthalmology is loaned. Prerequisite, Human Biology 465. (Limit: two students.)

#### OPHTH

484 Ophthalmic Pathology (1/2) AWSp Milam

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 process. Prerequisite, Human Biology 465. (Limit: two students.)

#### **OPHTH**

#### 497 Ophthalmology Special Electives (\*) AWSpS

Kalina

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisite, permission.

#### **OPHTH**

#### 498 Undergraduate Thesis (\*) AWSpS Futterman

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

Laboratory or clinical research in physiology, anatomy, or biochemistry of the visual system. Elective. Prerequisite, permission. (Limit: two students.)

# **ORTHOPAEDICS**

# CONJ

473 Musculoskeletal Pathology (2) Sp (See Conjoint Courses.)

#### CONJ

474 Advanced Musculoskeletal Pathology (2) Sp

(See Conjoint Courses.)

#### ORTHP

#### 415 Orthopaedic Biomechanics (2) Sp Lippert

Designed to provide a relevant engineering background for the understanding and solution of orthopaedic problems. Encompasses statics, dynamics, strength of materials, and metallurgy. Prerequisite, member of the hospital staff or, by arrangement, a student enrolled in bioengineering courses.

#### ORTHP

475 Preceptorship in Orthopaedics (\*) 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, Human Biology 465 or Surgery 465 and permission of the department. (2 weeks, full time.)

#### ORTHP

#### 476 Pediatric Orthopaedics (\*) AWSp Staheli

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 480. Prerequisite, Human Biology 465 or Surgery 465. (4 weeks, full time.)

#### ORTHP

#### 477 Musculoskeletal Trauma (6) AWSp Hansen, Staff (Harborview Medical Center)

Instruction takes place largely at Harborview Medical Center, where there is a high concentration of musculoskeletal trauma. The student follows the patient from the emergency room onto the wards and 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 em-phasis placed on physical examination of the patient. Students take correlative anatomy and pathology as in 480. Prerequisites, Human, Biology 465 and Surgery 465. (4 weeks, full time.)

#### ORTHP

#### 480 General Orthopaedic Clerkship (6) AWSp

Clawson, Staff

This clerkship offers the student the unique opportunity to study the wide variety of problems presented to a general orthopaedic service. The University Hospital offers general inpatient and outpatient clinics covering general trauma, bone and joint infections, degenerative joint disease, rheumatoid arthritis, and outpatient pediatrics. The Veterans Admin-istration Hospital is principally an inpatient service involved with a wide variety of musculoskeletal problems, including reconstruction of war injuries. Emphasis is placed on the diagnosis and the evaluation of functional deficits. Prerequisite, Human Biology 461 or Surgery 465. Students automatically are registered for 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. (4 weeks, full time.)

#### ORTHP

# 483 Sports Medicine (\*)

Preceptorship experience including observation of methods of injury prevention, establishment of proficiency in the examination of the injured athlete and assisting in the operative and nonoperative treatment of injured athletes. Students attend all sports medicine clinics and in-service teaching sessions.

#### ORTHP

#### 497 Orthopaedic External Elective (\*) AWSpS Clawson

Special arrangements can be made for students desiring to take orthopaedic electives at other institutions. Programs generally approved include orthopaedic clerkships at other universities or at large orthopaedic institutes. Prerequisites, Human Biology 465 and permission of the department.

#### ORTHP

#### 498 Undergraduate Thesis (\*) AWSpS . Clawson, Staff

Student works directly with a preceptor in selecting a suitable area for laboratory or clinical research in the area of orthopaedics, and develops a thesis recognition. Prerequisites,

Human Biology 423 and permission of department. (12 weeks.)

#### ORTHP

# 499 Undergraduate Research (\*) AWSpS

Greenlee, Staff Investigation of problems pertinent to the study of musculoskeletal problems in the orthopaedic laboratories as part of the research group. Prerequisite, permission of department. (12 weeks.)

# **OTOLARYNGOLOGY**

#### OTOL

# 481 Otolaryngology Clerkship (\*) AWSpS Donaldson (University Hospital)

Student participates in evaluation and care of outpatients and inpatients at the University Hospital. In addition he attends department conferences. Prerequisite, Human Biology 465. (4 weeks, full time.)

#### OTOL

# 482 Otolaryngology Externship (\*) AWSpS

Morrison (United States Public Health Service Hospital)

Student serves externship in otolaryngology in outpatient clinic, where visits average 600 per . month, supplemented by inpatient assignments. Individual training provided, giving student opportunity to utilize his own diagnostic abilities; student performs or assists instructor in all phases of patient work-ups and care; attends ward rounds and conferences. Prerequisite, Human Biology 465. (4 weeks, full time.)

#### OTOL

#### 483 Otolaryngology Externship (\*) AWSpS Hays (Madigan Hospital)

Individual externship training at outpatient clinic, where visits average 1,200 per month, supplemented by inpatient assignments. Student is responsible for patient work-ups; follows assigned patient to operating room; participates in ward rounds and hospital conferences. Students reside at the hospital during externship, using facilities of BOQ and hospital mess. (Subsistence and quarters charges, approximately \$2 per day.) Prerequisite, Human Biology 465. (2 or 4 weeks, full time.)

#### OTOL

#### 484 Otolaryngology Clerkship (6) AWSpS Strothers

Student participates in evaluation and care of outpatients and inpatients at Harborview Medical Center. He assists in surgery, and in addition, he attends department conferences at both Harborview Medical Center and University Hospital in conjunction with department training. Prerequisite, Human Biology 465.

#### OTOL

#### 485 Otolaryngology Externship (6) 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 oto-laryngology problems with special emphasis on childhood disease entities. Prerequisite, Human Biology 465 or Surgery 465. (4 weeks.)

#### OTOL

#### 487 Otolaryngology Clerkship (6) AWSpS West

Student participates in the evaluation and care of outpatients and inpatients at the Veterans Administration 'Hospital, to provide him or her with an adequate introduction to ear, nose, and throat problems. In addition, the student must attend department conferences at University Hospital. Prerequisite, Human Biology 431. (4 weeks. Limit: one student.)

#### OTOL

# 497 Otolaryngology Special Electives (\*) AWSpS

Donaldson

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisite, permission.

#### OTOL

# 498 Undergraduate Thesis (\*) AWSpS Donaldson, Miller

Student works directly with department faculty in selecting a suitable area for laboratory or clinical research in the area of otolaryngology, and develops a thesis for recognition. Prerequisite, permission.

#### OTOL

#### 499 Undergraduate Research (\*) AWSpS Donaldson, Miller

Research opportunities offered under direction in the area of otolaryngology. May be repeated for credit. (12 weeks.)

# PATHOLOGY

#### PATH

310 Introduction to Pathology (3) A Barker, Wiegenstein, Wolf

Study of causes, processes, and effects of important diseases. Required course for students in medical technology, dental hygiene, physical therapy, and pharmacy. Prerequisites for other students include Conjoint 317-318, and Microbiology 301 or equivalent courses in human anatomy, human physiology, or microbiology.

#### PATH

#### 430 Human Cytogenetics (2) A

Hoehn Sources and methods of preparation and identification of human chromosomes. Human cytogenetic pathology; karyotype-phenotype interactions. Prerequisite, permission.

#### PATH

#### 444 General Pathology (4) A Page

Study of basic pathologic processes that underlie disease, including inflammation, neoplasia, infarction, and cellular alterations. An attempt is made to correlate the gross, functional, and biochemical alterations. Lectures, demonstrations, small-group discussions are used to convey these concepts. The course is designed for second-year dental students, graduate students, and others with a reasonable grounding in biologic and chemical science. Prerequisite for nondental students, permission.

# PATH

#### 445 Systemic Pathology (3) W Kohnen

Survey of pathologic processes affecting organs and systems of particular pertinence to the practice of dentistry. Lectures and demonstrations to present a coherent picture of systemic disease presented. For second-year dental students or graduate students. Prerequisite for nondental students, permission.

#### PATH

#### 460 Introduction to the Analysis of Human Disease I (3) AWSpS

Reichenbach (University Hospital, Harborview Medical Center, Virginia Mason Hospital)

Autopsy participation and review 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

#### 461 Introduction to the Analysis of Human Disease II (\*) W

Martin

The goal is to illustrate and integrate histologic, biochemical, and physiologic parameters in disease and their modification by therapy. Emphasis is on disease at the level of the microscopic autopsy review, but includes both autopsy and surgical material and covers gross, microscopic, biochemical, and physiological abnormalities as they relate to understanding the pathogenesis of disease. Prerequisite, permission. (Limit: ten students.)

# PATH

#### 462 Cardiovascular Pathology Conference (\*) AWSpS

Reichenbach

Course consists of two parts: a laboratory review of gross and microscopic cardiovascular pathology of selected autopsied cases followed by a combined clinical (medical and/or surgical) and pathology conference discussing these cases. Prerequisites, Human Biology 440 and permission.

#### PATH

# 463 Neuropathology (\*) AWSpS Alvord, Leech, Shaw, Sumi

Course consists of ten parts, some or all of which may be taken separately or concurrently. Conferences on gross neuropathology (brain cutting and clinic opathologic 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 néuropathology con-ferences (as part 7) and/or weekly neurologyneuropathology 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

#### 464 Neuropathology Brain Modeling (4 or 8) S Alvord

Three-dimensional neuroanatomical relationships, critical for understanding neuropathology, can best be obtained in the construction of a model of the brain. Students may elect to participate in the actual brain modeling and/or attend a series of accompanying lectures that emphasizes comparative (phylogenetic) and developmental aspects of the segmental, intersegmental, and suprasegmental components of the human nervous system.

#### PATH

#### 465 Surgical Pathology (\*) AWSpS Huang

Study of fresh gross surgical specimens and review of microscopic sections of diagnostic problems in general surgery. Prerequisites, Human Biology 465 and permission.

#### PATH

#### 467 Renal Pathology Conference (1-6) AWSpS

Striker

Light and electron microscopic study of human and experimental renal disease. Conference discussions and individual study. Students should concurrently register for Medicine 493. Prerequisite, Human Biology 420.

# PATH

#### 468 Skin Pathology (1) AWSpS Barker

Histopathological aspects of skin diseases are presented and discussed in a group-conference type of seminar. Current dermatologic cases also are discussed. Prerequisites, dermatology elective and permission.

#### PATH

#### 469 Oral Pathology (1-3) W Page

Experience in, and recognition and interpretation of, the histopathologic and clinical manifestations of the oral cavity, and study of basic pathological mechanisms responsible for these conditions. Prerequisites, Human Biology 420 and 431, and permission.

# PATH

#### 470 Gastrointestinal Pathology (1) 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 Human Biology 441. (Limit: six students.)

#### PATH

#### 471 Neuroanatomic Pathology (2½) W Alvord, Leech, Shaw, Sumi

The particular diseases occurring in specific parts of the nervous system are considered in terms of the segmental (motor, sensory, and association plates), intersegmental (reticular formation), and suprasegmental (cerebellum, colliculi, and forebrain) components. Clinicopathologic correlations are emphasized in the discussions of the syllabus and study sets of 35-mm. lantern slides. Prerequisites, Human Biology 432 and permission; 472 recommended; 463 recommended as concurrent course.

# PATH

#### 472 Neuropathologic Reactions (21/2) A Alvord, Leech, Shaw, Sumi

The reactions of the nervous system, only more or less similar to those of other organs of the body, are considered in terms of congenital malformation, inflammations, vascular, traumatic, metabolic-toxic, degenerative, and neoplastic diseases peculiar to the nervous system as a whole. Clinicopathologic correlations are emphasized in the discussions of the syllabus and study sets of 35-mm. lantern slides. Prerequisites, Human Biology 432 and permission; 463 recommended as concurrent course.

# PATH

#### 473 Cardiovascular Pathology (3) W Reichenbach

The spectrum of cardiovascular pathology is covered in depth by case studies and by gross and microscopic material. Case analysis for presentation, including clinical and gross and microscopic material, is prepared outside of class time. Topics covered include cardiomyopathy, pathology of the pulmonary vasculature, vasculitis, neoplasms, inflammatory diseases, diseases of the pericardium, valvular heart disease, hypertension, arteriosclerotic heart disease, and congenital heart disease. Clinicopathologic correlation is emphasized. Pre-requisite, Human Biology 440. (Limit: fourteen students.)

# CONJ

473 Musculoskeletal Pathology (2) Clawson, LaZerte

(See Conjoint Courses.)

#### CONJ

#### Advanced Musculoskeletal Pathology (2) 474 Clawson, LaZerte

(See Conjoint Courses.)

#### PATH

#### Systemic Pathology (3, max. 6) WSp 475 Lagunoff, Reichenbach

Systematic presentation of disease processes organized on the basis of the organ systems with emphasis on dynamic morphology and clinicopathologic correlation. Prerequisite, Human Biology sequence through 440.

#### PATH

#### 476 Clinical Pathological Conference (\*) AWSD Mottet

Interesting, unusual, or provocative cases principally from the University Hospital are presented for discussion by senior staff of the clinical and basic sciences. For medical students; graduate students by permission. May be re-peated for credit. Medicine 465, Surgery 465, and Pathology 480 are recommended as concomitant courses.

#### PATH

#### 480 Diagnostic Pathology Clerkship (\*) AWSpS

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, Vetrerans Administration Hospital, Harborview Medical Center, and Children's Orthopedic Hospital and Medical Center, and selected community hospitals. Prerequisites, Human Biology 420 and permission. (6, 8, 10, or 12 weeks.)

#### PATH

# Undergraduate Thesis (\*) AWSpS Benditt, Staff 498

Elective. Prerequisite, permission.

#### PATH

# 499 Undergraduate Research (\*) AWSpS

Benditt, Staff Elective. May be repeated for credit. Prerequisite, permission.

# **Courses for Graduates Only**

#### PATH

500 Principles of Pathology (5) A Benditt, Staff

The basic pathologic processes, such as inflammation, neoplasia, cell alteration, and genetic and developmental pathology. Lec-tures, laboratory exercises, and demonstrations of human pathologic materials are used to teach the basic concepts of pathology that are important in medical and biologic research. Suitable knowledge of gross anatomy, histology, physiology, and biochemistry is required. Prerequisite, permission.

## PATH

#### 501 Cellular Response to Injury (2) A Smuckler

Lecture-seminar. Considerations of current concepts of cellular and subcellular reactions to injury, including neoplasia, as studied by modern techniques of cell biology. Required of all pathology graduate students. Prerequisite, permission. (Offered even-numbered years.)

#### PATH

#### 502 Inflammation and Repair (2) Sp Lagunoff

Lecture-seminar; a seminar course dealing with an in-depth examination of the processes involved in inflammation and repair. Required of all pathology graduate students. Prerequisite, permission. (Offered odd-numbered years.)

#### CONJ

#### Somatic Cell Genetics (2, max. 6) 503 Gartler, Martin, Pious

(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 ultra-structural 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

Mottet

The anatomical features of human disease as revealed at surgery or postmortem by gross examination and light microscopy are correlated with chemical and physiologic changes. Prerequisites, graduate student standing and permission.

#### PATH

#### 512 Introduction to the Anatomical Analysis of Animal Disease (5, max. 10) AWSp Giddens

Designed for students who will use animals in the experimental study of disease, and with an introduction to: (1) techniques of animal necropsy, (2) characterization and interpretation of gross and microscopic lesions, (3) correlation of lesions with altered physiological processes, (4) differentiation between naturally occurring and experimentally induced lesions. Under supervision, 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 experimen-tally 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

#### 551 Experimental and Molecular Pathology (2-5, max. 20) AWSpS Benditt, Staff

Introduction to experimental pathology. A tutorial course designed to introduce a graduate student (medical, dental) or senior un-dergraduate to selected methods and problems through literature surveys and/or laboratory experience. Exploration of causes at the cellular and molecular levels in the study of disease is emphasized. May be repeated for

#### PATH

#### 552 Contemporary Anatomic Pathology (2-5, max. 30) AWSpS Mottet

credit. Prerequisite, permission.

Study of recent developments in anatomic pathology. Subject includes areas of basic science and review of systemic pathology. Recent developments and interpretation of these findings are stressed. For pathology residents, fellows, and trainees. May be repeated for credit. Prerequisite, permission.

# CONJ

# 560 Tumor Biology (3)

Champoux, Hakomori, I. Hellstrom, K. Hellstrom, Smuckler (See Conjoint Courses.)

#### PATH

600 Independent Study or Research (\*) AWSpS ·

#### PATH

- 700 Master's Thesis (\*) AWSpS
- PATH
- 800 Doctoral Dissertation (\*)

# MEDICINE

# PEDIATRICS

PEDS

# 401 Survey of Human Growth and

Development (11/2) AWSp Kirschner, Wenner (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 402-403-404. Credit is not allowed for both 401 and 402-403-404. Prerequisite, permission. PEDS

#### 402-403-404 Human Growth and Development (11/2-11/2-11/2) A,W,Sp Wenner

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 observations take place in the Newborn Nursery, Well Child Clinic, and the child's home. The contribution of the child's constitution, particularly as manifested at the time of birth, is shown as interacting with the situational peculiarities of his family environment. A synthesis of information about the child, reflecting the student's experience in the course, is required in lieu of a final examination. There is an opportunity to observe, to discuss, and to participate in the doctor-patient relationship. Two hours of clinic demonstration and conference a week, with five hours of additional special activities, such as home visits, nursery observation, etc., each quarter, and the preparation of two papers in lieu of examinations. Prerequisite, permission.

#### PEDS

# 405 Longitudinal Pediatric Management (\*) AWSpS Wenner

Opportunity for the student to continue contact with the child who has been the focus of his learning in 402-403-404. Emphasis is placed on the emergence of longitudinal trends in the development of the child, with the increasing clinical skills of the student making appropriate his assumption of the clinician role in relation to this child. Allows longitudinal study of development and the relating of this to clinical medicine. Prerequisites, 402-403-404 and permission.

#### UCONJ

#### 410 Study of Interdisciplinary Evaluation and Management of Handicapped Children (3) AWSpS

For course description, see "Interschool or Intercollege Programs."

#### PEDS

#### 411 Community Night Clinics (2) 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, Human Biology 465.

#### PEDS

# 412 Laboratory in Human Embryology and Teratology (3) W Shepard (University Hospital))

Allows the student to specialize in the area of human embryology and teratology. Exact stages of human development (Streeter's Horizons) are described, and studies are conducted in the 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.

#### CONI

# 450 Clinical Infectious Diseases (3) (See Conjoint Courses.)

# PEDS

#### 451 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 electro-cardiograms are studied, followed by abnormal tracings, with emphasis on pediatric material, but including adult material such as myocardial infarction.

# PEDS

#### 453 Nutrition for Physicians (2) W Smith

Clinically related nutritional considerations in both health and disease. The material is presented in a basic information series of selfteaching tapes and slides. This series covers basic nutrients, nutritional requirements, dietary practices, and nutritionally related pathological states. Emphasis on the interpretation of normal dietary practices and their devia-tions, particularly as related to changing life styles in our current culture. (Limit: thirty students.)

#### CONJ

464 Perinatal Clerkship (9) (See Conjoint Courses.)

#### PEDS

465 Pediatric General Clerkship (\*, max. 16) AWSpS

Robertson

General inpatient and outpatient pediatric clerkship at a variety of locations, including Children's Orthopedic Hospital and Medical Center, University Hospital, Harborview Medical Center, Madigan General Hospital, and WAMI units in Idaho, Montana, and Washington. Besides his clinical experience, the student has a faculty preceptor and attends seminars on major pediatric subjects. Prerequisite, Human Biology 465.

# PEDS

#### 469 Neonatal Pediatrics-Clerkship (\*) AWSpS

Hodson

Participation in the activities in the newborn and premature divisions; ward rounds, semi-nars, conferences, and familiarization with certain laboratory techniques; particularly those re-lating to acid-base balance. Prerequisite, 465.

#### PEDS

#### 470 Pediatric Infectious Diseases and

Immunology (\*) 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, 465 or permission.

#### PEDS

472 Clinical Experience in Child Growth and Development (\*) AWSp Wenner

Experience at the Clinical Training Unit in the common problems met in clinical practice among children from infancy through adolescence. Emphasis is on normal development and behavior. Prerequisite, Human Biology 465.

### PEDS

# 473 Office Practice (\*) AWSpS

Bergman

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, 465.

#### PEDS

#### 474 Social Problems Related to Child **Development and Health Care (\*)** AWSpŠ Deisher

Combined experience with normal and handicapped infants, children, and adolescents from low-income families and minority cultures and races. Special emphasis on the effect of environment on the child and his functioning. Prerequisite, Human Biology 465.

#### PEDS

#### 476 Pediatric Clerkship With the Mentally Handicapped (\*) AWSpS

Reichert (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, Chil-dren's Orthopedic Hospital and Medical Center. Prerequisite, 465. (4 or 6 weeks, full time.)

#### CONJ

477 Clinical Allergy (\*) (See Conjoint Courses.)

#### PEDS

#### 479 **Clinical Problems in Mental Retardation** and Related Handicaps (\*) 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, 465.

#### PEDS

#### 480 Pediatric Clinics (\*) 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, Human Biology 465.



# PEDS

481 Inborn Errors of Metabolism (\*) AWSp Scott

Clinical and laboratory experience related to biochemical errors of metabolism is offered. Emphasis is on the recognition, laboratory diagnosis, and genetic mechanisms operating in human disorders. Prerequisite, 465 or permission.

# PEDS

# 482 Congenital Defects (\*) AWSpS Shurtleff

Advanced course in pediatrics providing experience in the clinical diagnosis and management of structural and metabolic congenital defects. Prerequisite, permission.

#### PEDS

# 485 Pediatric Hematology and Oncology (\*) AWSpS

Hartmann

Laboratory and conference participation with the hematology and the oncology units at Children's Orthopedic Hospital and Medical Center. Prerequisite, 465.

# PEDS

486 Pediatric Cardiology (\*) 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 knowledger of diagnostic techniques and surgical possibilities. Observation of catheterizations and cardiovascular operations may be arranged at the option of the student. There are two cardiac clinics per week, and rounds on inpatients with cardiovascular problems occur twice daily. On average, two or three catheterizations and one cardiac surgery are performed weekly. Prerequisite, 465.

# PEDS

#### 487 Advanced Clinical Clerkship in Child Neurology (\*) AW

Carlson

Advanced course in neurology dealing with neurological disease in children. Both inpatient and outpatient experience are included. Prerequisite, 465.

#### PEDS

#### 488 Adolescent Development (\*) AWSp Deisher

Advanced pediatric clerkship dealing with special problems of the adolescent. Medical students are offered an experience in a multidiscipline clinic. Prerequisite, 465.

#### PEDS

#### 490 Advanced General Pediatrics—Madigan General Hospital (\*) AWSpS Robertson

Outpatient, ward, and/or newborn experience, especially with the more common types of pediatric problems. Prerequisites, 465 and permission.

#### PEDS

#### 491 Advanced Pediatric Elective Clerkship (\*) 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. May be repeated for credit. Prerequisite, 465.

#### PEDS

#### 497 Pediatric Special Electives (\*) AWSpS Robertson, Staff

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.

#### PEDS

#### 498 Undergraduate Thesis (\*) AWSpS Robertson, Staff

For medical students. Prerequisite, permission.

### PEDS

#### 499 Undergraduate Research (\*) AWSpS Robertson, Staff

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.

# Course for Graduates Only

#### PEDS

505 Physical Growth of the Well Child (2) W Kelley

Nine weekly seminars (18 hours). Presentation by departmental staff of relationships between growth and development and diseases as they pertain to dental health. For twenty graduate students in dentistry. (Offered even-numbered years.)

# **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 students.

#### PHCOL

#### 300 Principles of Drug Action (3) Sp

Current concepts of the actions and effects of therapeutic and toxic chemicals. Prerequisites, Chemistry 100 or 101 and Biology 100 or 101-102, or permission.

#### 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, Chemistry 236, Physiology and Biophysics 360, Biological Structure 301, Pathology 310, and Biochemistry 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

#### 441 Fundamental Principles and Mechanisms of Drug Action (3) A Juchau

# PHCOL

#### 442 General Pharmacology (3) W Dyer

Biology 440, or permission.

Study of drugs acting on the autonomic nervous and cardiovascular systems. Emphasis on physiological and biochemical mechanisms with consideration of their therapeutic and adverse effects. Prerequisite, 441 or Human Biology 432 or permission.

#### PHCOL

#### 443 General Pharmacology (2) W Davis

Lectures and discussions on the pharmacology of the kidney, gastrointestinal tract, endocrine system, and chemotherapy of parasitic, microbial, and neoplastic disease. Prerequisite, 441 or Human Biology 415 or permission.

## PHCOL

#### 444 General Pharmacology (3) Sp Halpern

Advanced elective neuropsychopharmacology as a basis for therapeutic applications of drugs for use in neurology, psychiatry, and anesthesiology. 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, interactions, safety, and limitations of therapeutic effectiveness. Prerequisite, 411 or Human Biology 432, or permission.

#### PHCOL

#### 445 General Pharmacology Laboratory (3) W Davis

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 mam-

# MEDICINE

malian systems. One lecture and one four-hour laboratory per week. Prerequisite, permission.

#### PHCOL

#### 497 Pharmacology Special Electives (\*) AWSpS

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise student of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration.

#### PHCOL

498 Undergraduate Thesis (\*) AWSpS

For medical students. Prerequisite, permission.

# PHCOL

#### 499 Undergraduate Research (\*) AWSpS Davis

Participation in departmental research projects. For medical students. Prerequisite, permission.

# **Courses for Graduates Only**

# PHCOL

507 Pharmacology Seminar (1) AWSp Davis

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.

# PHCOL

510 Current Topics in Pharmacology (2) W Davis

Recent progress in pharmacological research. Considered areas include renal pharmacology, polypeptides, and selected aspects of toxicology. Prerequisite, permission. (Offered alternate years; offered 1975-76.)

#### PHCOL

#### 511 Special Pharmacological Techniques (3) S

Laboratory treatment of biochemical, biophysical, and surgical approaches employed in pharmacological investigation. Prerequisites, 401, 402 or 234, or permission.

# PHCOL

#### 525 Cardiovascular Pharmacology (2) Sp Vincenzi

Advanced considerations of drug actions on the cardiovascular system. Emphasis on cellular and membrane actions of drugs influencing cardiac automaticity, excitability, contractility, and interpretation of original research in these areas. Open to medical and graduate students. Prerequisites, 401, 402 or 442 or 444 or Human Biology 440, or permission. (Offered alternate years; offered 1974-75.)

#### PHCOL

#### 526 Autonomic Pharmacology (2) W Horita

Advanced treatment of pharmacologic effects on storage, release, and action of autonomic transmitter substances. Prerequisites, 442 or 401, 402 or 234, or permission. (Offered alternate years; offered 1974-75.)

#### PHCOL

#### 527 Biochemical Pharmacology (2) A Juchau

Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Included are reaction mechanisms, ultrastructural considerations, induction mechanisms, methodology, kinetics of inhibition and activation, steroid and amine metabolism, and implications in modern therapy. Open to medical and graduate students. Prerequisite, one year graduate, medical, or dental biochemistry, or permission. (Offered alternate years; offered 1974-75.)

# PHCOL

# 528 Neuropsychopharmacology (2) A Halpern

The pharmacology of the central nervous system. Prerequisites, 444 or 401, 402 or 234, or permission. (Offered alternate years; offered 1975-76.)

#### PHCOL

#### 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 234, or permission. (Offered alternate years; offered 1975-76.)

#### PHCOL

533 Methods of Toxicology (2) Sp .

Loomis

A combined laboratory demonstration and didactic consideration of chemical, physical, and biological methods involved in studies of harmful effects of chemicals on biological tissue. Prerequisites, 401, 402 or 234, or permission. (Offered alternate years; offered 1974-75.)

#### PHCOL

534 Advanced Dental Pharmacology (3) Sp In-depth treatment of the pharmacology of those drugs commonly employed in the practice of dentistry. Prerequisite, 234 or equivalent.

#### PHCOL

600 Independent Study or Research (\*) AWSpS

# PHCOL

700 Master's Thesis (\*) AWSpS

#### PHCOL

800 Doctoral Dissertation (\*) AWSpS

# **PHYSIOLOGY AND BIOPHYSICS**

# CON

317-318 Introductory Anatomy and Physiology (6-6) AS,WSp (See Conjoint Courses.)

#### (See Conjouri Courses.)

#### P BIO

#### 350 Basic Human Physiology I (2-6, max. 6) AWSpS Brown

Neurophysiology. The function of the human

nervous system: peripheral nervous system, sensory function, the brain. At present, offered only through the Division of Evening and Extension Credit Programs. Prerequisite, general chemistry or zoology or permission.

#### P BIO

# 351 Basic Human Physiology II (2-6, max. 6) AWSpS

Brown

Transport and exchange organ systems responsible for distribution of materials within the body and regulation of the internal environment: cardiovascular system, respiratory system, renal (kidney) system. At present, offered only through the Division of Evening and Extension Credit Programs. Prerequisite, general chemistry or zoology or permission.

#### P BIO

#### 352 Basic Human Physiology III (2-6, max. 6) Brown

Metabolism and endocrinology. The systems associated with energy metabolism and body hormones: blood, body fluids, and energy exchange; the gastrointestinal system; endrocrinology and reproduction. At present, offered only through the Division of Evening and Extension Credit Programs. Prerequisite, general chemistry or zoology or permission.

#### P BIO

#### 360 General Human Physiology (5) A Conrad

Special laboratory sections are designed for engineering students. Full credit toward the inter-engineering M.S.E. degree is allowed. Prerequisite, permission from Bioengineering Center.

#### CONJ

#### 400 Human Anatomy and Physiology (6 or 9) A

(See Conjoint Courses.)

#### P BIO

#### 405 Human Physiology (6) W Brengelmann, 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

# 409 Physiology of Transport Organ Systems (31/2) A

Stirling

Detailed biophysical discussion of diffusion and active sodium-potassium transport provides a foundation for a subsequent presentation of transport phenomena of the alimentary canal (motility, secretion, and absorption) and of the kidney (filtration, reabsorption, and secretion). Although integration of these functions is discussed, their cellular and membrane transport mechanisms are stressed. Prerequisite, permission. (Formerly 413.)

#### P BIO

## 410 Nerve-Muscle Physiology (3) A

Gordon, Hille

Detailed consideration of the active ion transport, nerve-impulse conduction, neuromuscular synaptic transmission, excitation-contraction coupling, and contraction coupling and contractile processes of vertebrates. Aim is to convey the concepts of excitable, synaptic, and contractile phenomena. Prerequisite, permission.

# P BIO

#### 411 Neurophysiology (3½) W Patton

Functioning of the central nervous system (somatic and visceral); special senses (audition, vision, vertibular); descending systems (cortical and subcortical); cerebellum; hypothalamus; behavior and neurophysiology; comparative neurophysiology. Prerequisite, permission.

#### CONJ

# 411 Functional Neuroanatomy (31/2) (See Conjoint Courses.)

P BIO

#### 412 Cardiovascular Physiology (3) Sp Rowell

Considers the function of the heart and blood vessels from a cellular and organ point of P

view, including the regulation of flow to various organs. Integrates much of this material into a consideration of the cardiovascular system. Prerequisite, permission.

# P BIO

# 413 Regulation of Temperature, Respiration, and Acid-Base Balance (3½)

Young

Introduction to control systems theory covering, in moderate depth, temperature regulation, metabolism, respiratory gas transport, mechanics and control, respiratory control, and acid-base regulation, primarily as related to humans. Prerequisites, elementary physics, mathematics, biology, and permission.

#### P BIO

#### 414 Physiology of Metabolic and Endocrine Regulation (2½) Sp

Gale

Control functions of endocrine system: pituitary, hypothalamus, target organs, thyroid, adrenal cortex and medulla, pancreas, parathyroid, reproduction physiology. Prerequisite, permission.

#### P BIO

#### 415 Physiology Laboratory (1-2) AWSp Fuchs

Small-group experiments to complement the course content of 409 through 414. Four or five different laboratories are scheduled for each quarter. May be repeated for credit. Prerequisite, permission.

#### P BIO

# 418 Biological Instrumentation (4) S

Brengelmann, Luschei Principles of biological instrumentation sys-

tems, transfer relations, transient and frequency response of simple systems, noise, feedback and control systems, analog computation. Oriented toward biology, medical, and premedical students. Prerequisites, beginning calculus and permission.

#### P BIO

#### 419 Biological Instrumentation Laboratory (2)

Brengelmann, Fetz, Luschei

Laboratory to illustrate and extend material presented in 418. Prerequisite, permission.

#### P BIO

#### 424 Vision and Its Physiological Basis (5) A . Teller

Phenomena of human vision, including: spectral sensitivity, color vision, spatial interactions, light and dark adaptation, distance perception, and binocular interactions. Techniques for the study of vision in human subjects are included. The correlation of human visual functioning with known optical, biochemical, anatomical, and physiological factors is stressed. Offered jointly with the Department of Psychology as Psychology 424. Prerequisite, permission; some background in a physical or biological science is recommended.

#### P BIO

# 427 Abnormal Physiology (2) W Crill, Stevens

Selected topics in the cardiovascular, renal, respiratory, and nervous systems that illustrate physiological changes in clinical disease and clinical examples of basic physiologic principles. Prerequisite, permission.

#### P BIO

#### 430 Mathematical Methods of Physiology and Biophysics (3) A Stevens

Selected mathematical methods particularly useful in physiology and biophysics are developed. Emphasis is on deriving mathematical descriptions, usually in the forms of ordinary or partial differential equations, for physiological systems. Topics covered usually include solution of differential equations using the Laplace transform linear approximation of nonlinear systems, transfer function, and Green's function description of physiological systems. Prerequisite, permission.

#### **P BIO**

#### 431 Theory of Biological Control Systems (3) W

# Brown

Emphasizes development of the mathematical techniques used in biological control systems analysis: block and signal flow diagrams, description of response of feedback systems; roots and poles of linear systems; frequency response and Bode plots; s-plane 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 432; offered 1975-76.)

#### P BIO

#### 432 Applications of Blological 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 431; offered 1974-75.)

P BIÓ

#### 437 Computer Programming for Biological Research (3) S Kehl

Application of procedure-oriented languages to biological research. Stress is placed on programming in FORTRAN IV, ALGOL, and digital-analog simulator. Programming practice on various computers is assigned with term-program written at conclusion of course. Prerequisite, permission.

#### **P BIO**

#### 470 Selected Topics in Endocrinology and Metabolism (3) A

Gale Reading and discussion of current literature with emphasis on regulatory mechanisms in mammals. May be repeated for credit. Prerequisite, permission.

#### P BÍO

#### 494 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, Human Biology 432 taken prior; others by permission.

#### 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.

# **Courses for Graduates Only**

### P BIO

505 Physiological Acoustics (3) Sp Miller

Seminars on the physiological basis for audition. Includes discussion of the function and the structure of the auditory system, the ear, mechanics, transduction processes, and physiology of control pathways. Prerequisite, permission. (Offered alternate years with 546; offered 1975-76.)

#### **P BIO**

#### 506 Physiological Basis of Dental Science (3) S

#### Van Hassel

Current concepts in areas of physiology related to dentistry, including pain, taste, speech, microcirculation, occlusion, and calcification. Review of basic physiologic mechanisms, survey of recent literature and design of applied dental research in each area. Offered jointly with the Department of Endodontics as Endodontics 525. Prerequisite, permission.

#### CONJ

509 Neurochemistry (3) W (See Conjoint Courses.)

#### **P BIO**

#### 515-516-517 Physiological 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

# 519 Membrane Blophysics Seminar (1)

AWSp Hille

Detailed discussion and study of current topics in cell membrane function and structure. May be repeated for credit. Prerequisite, permission.

#### P BIO

#### 520 Physiology Seminar (\*) 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 . (2-5) A

Young

Viscous and elastic properties of chest-lung system; flow of gases in tubes. Generalized alveolar air equations. Gas transport. 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 dis-

# MEDICINE

tribution within the body. Properties of cutaneous and deep temperature receptors. Neural integration and homeothermy. Prerequisite, permission.

#### P BIO

#### 524 Advanced Membrane Potentials (\*) Sp Hille

Quantitative analysis of electrical activity in nerve. Active sodium-potassium transport. Ionic flux equations. 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 (2-5, max. 10) A

Young

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Theories of nonlinear mechanics and their applications to physiological systems. May be repeated for credit. Prerequisite, permission.

# P BIO

#### 530 Synapse and Reflex Seminar (4) A Patton

Guided survey of the literature pertaining to reflex and synaptic physiology. Course is conducted as seminar with students giving oral reports on assigned topics. Prerequisites, 515 and permission.

#### P BIO

#### 531 Biophysics of Circulation (3) A Scher, 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 1974-75.)

P BIO

#### 535 Operative Techniques in Neurophysiology (2-5) S

Luschei, Smith

Decerebration, cortical ablation, stereotaxic lesions, cardiovascular surgery, chronic electrode implants, anesthesiology, and colony management. Prerequisite, permission.

#### 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.

# 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

#### 545 Physiology of Vision (3) Sp Stevens, Teller

Selected readings from recent literature on visual systems. Emphasis is placed on studies of single neuron discharge, but other topics, such as biochemistry of visual pigments and optical properties of the eye, are usually included. May be repeated for credit. Prerequisite, permission.

### P BIO

#### 546 Advanced Physiological Acoustics (3) Sp Miller

Advanced seminars in physiological acoustics, including experimental anatomy of peripheral and central auditory system, receptor encoding of auditory information, frequency discrimination, binaural hearing, sound localization, efferent modulation of auditory activity. Prerequisite, permission. (Offered alternate years with 505; offered 1974-75.)

#### P BIO

# 549 Properties of Neurons (\*) Sp

Stevens Selected readings from recent literature comparing properties of neurons from different regions of the vertebrate central nervous system. Emphasis is on the critical evaluation of data obtained by intracellular recording. May be repeated for credit. Prerequisite, permission.

#### P BIO

#### 550 Cortical Potentials (4)

Towe

Properties of continuous and evoked potentials and their interactions. Relationship of cortical unit activity to cortical potentials. Prerequisites, 515, and permission.

# P BIO

#### 551 Physiology of Cerebellum (3) Sp Kennedy

Function of cerebellum and its afferent and efferent systems; discussion of current physiological literature. Prerequisite, permission.

#### **P BIO**

#### 559 Integrative Neurophysiology (3) Sp Towe

Interpretation of neurophysiological phenomena from comparative, biophysical, and evolutionary standpoints. Prerequisite, permission.

#### P BIO

#### 560 Contraction of Skeletal Muscle (\*) Sp Gordon

Structure and properties of skeletal muscle leading to contraction theories. Length-tension relations. X-ray diffraction and fine structure studies. Sliding filament hypothesis. Mechanical properties. Heat and chemical studies. Excitation-contraction coupling. May be repeated for credit. Prerequisite, permission.

#### P BIO

#### Special Topics in Physiological Control Systems (\*) AWSpS Young

Selected physiological control systems are covered in detail. Literature survey of pertinent papers is used as a basis for indicating the direction of future research. May be repeated for credit. Prerequisite, permission.

#### P BIO

#### 600 Independent Study or Research (\*) AWSpS

# P BIO

700 Master's Thesis (\*) AWSpS

#### P BIO

800 Doctoral Dissertation (\*) AWSpS

# PSYCHIATRY AND BEHAVIORAL SCIENCES

#### PBSCI

#### 267 Preventive Methods for Mental Health (2) W

Taylor

Explores the concepts of mental health and mental illness and the factors that produce each, with analysis of methods of primary, secondary, and tertiary programs, including psychological, social, and cultural factors. For nonmedical students.

#### UCONJ

#### 410 Study of Interdisciplinary Evaluation and Management of Handicapped Children (3)

For course description, see "Interschool or Intercollege Programs."

#### PBSCI

#### 440 Physiology of Emotions (\*) WSp Holmes

Seminar based on discussion of selected reading of original articles from psychophysiologic and psychosociologic literature. Designed to orient and interest students for participation in current or future research projects and clinical medicine. Seminar format with guided reading and appropriate case material. For medical students; graduate students by permission.

#### PBSCI

# 441 Clinical Geropsychiatry (3) AWSp

Preston, B. A. Stotsky, M. A. Stotsky Combined clinical and didactic experience in the prevention, diagnosis, and treatment of emotional disorders in the aged. Includes observation and interaction with both well and ill old persons in community agencies and in extended care facilities. A didactic seminar explores such topics as psychotherapeutic interventions and psychopharmacology in the elderly, reality orientation, alternatives to institutionalization, and successful life styles for the elderly. For medical students; others from health sciences with permission of instructor.

# PBSCI

#### 442 Cross-Cultural Mental Health (2) AWSp James

Examination of several social systems with regard to the manner in which patterns of mental illness are developed, maintained, or modified by cultural elements. Lecture-discussion course with guided reading. May be repeated for credit. (Limit: fifteen students.)

# CONJ

#### 444 Medical Aspects of Sexual Problems (11/2)

(See Conjoint Courses.)

#### PBSCL

#### 445 Sensitivity Training Group (1) A Sata

An unstructured small-group experience in which the participants learn from experience about group functioning and increase their awareness to group interaction and feedback on themselves and their perception of others. Medical students only. (Limit: twelve students.)

#### PBSCI

#### 447 Problems and Dynamics of Families and Small Groups (2) W Townes

Discussion of the dynamics of family and small-group functioning include cross-cultural data, the structure of communication, leadership, influence and attitude change, cohesiveness, modeling, role assignment, and the relationship of poverty to family style, with particular focus on the pertinence to medical practice. Medical students and advanced gradduate students only. Seminar format with guided reading. (Limit: fifteen students.)

#### PBSCI

#### 448 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

#### 449 Principles of Research in Psychopathology (2) W Becker

Review of current literature on selective aspects of personality deviation. Theoretically relevant research on the functional psychoses is stressed. Open to medical students and advanced undergraduate students with the equivalent of an introductory or abnormal psychology course. Can be combined with a research project of the student's own choosing. (Limit: ten students.)

#### PBSCI

### 451 Principles of Personality Development (2) Sp

Heilbrunn

Consideration is given to the physiologic, psychologic, and cultural factors from maturity through old age. Prerequisite, senior or graduate standing.

# PBSCI

#### 452 Clinical Psychiatry (2 or 3) W Scher

Traces the development of psychiatric concepts to the present day, including theories of causation, prevention, and treatment. Emphasis on the use of therapies appropriate to the diagnosis. Didactic earns only two credits; didactic plus patient demonstrations earns three credits. Prerequisite, permission.

#### PBSCI

#### 455 Psychoanalytic Theory (1) A Ripley

Basic concepts of psychoanalysis, including the psychology of errors, dreams, the meaning of symptoms. Transference and the libido theory are considered. Seminar format with guided reading. Medical students only. (Limit: fifteen students.)

#### PBSCI

#### 456 Classical Readings in Psychiatry (2) W Ripley

Selected readings from writings of leading contributors to psychiatric theory. Among them are Janet, Freud, Adler, Jung, Sullivan, Meyer, and Erikson. Seminar format with guided reading. Medical students only. (Limit: fifteen students.)

#### PBSCI

# 457 Theory of Learning and Behavior Modification (2) AW

Armstrong Theory and technique of behavior modifica-

tion as they are applied to behavioral adjustment problems of adults and children. Seminar format with guided reading. Prerequisite, permission. (Limit: forty students.)

#### PBSCI

# 458 Psycho-Social Growth and Development (2) A

Townes

Reviews the current literature on psychosocial influences on development and modification of self-esteem, affiliation, cognitive complexity, self-control, conformity, productivity, and cooperation. Open to medical students and to advanced undergraduate students.

#### PBSCI

#### 459 Interviewing Techniques (1) W Ripley

Practice with interviewing psychiatric patients, followed by discussion of the technical and clinical aspects. Medical students only. Prerequisites, Human Biology 423, 463. (Limit: ten students.)

# PBSCI

# 460 Community Psychiatry (3) A

Taylor Familiarizes students with the role of medicine and psychiatry in the community mental health center movement. Introduces the student to community resource systems and analyzes some of the social problems contributing to community mental health concerns. Open to medical students and graduate students by permission. (Limit: ten students; minimum: five students.)

#### PBSCI

### 462 Principles of Hypnosis (2) Sp

Ripley

History and theory of hypnosis. Induction techniques. Application to the treatment of illness. Medical students only. Prerequisite, permission.

#### PBSCI

#### 463 Experience in the Child Day Care Unit (9) AWSp

Davis

Involves working in the Child Day Treatment Unit with a seriously disturbed child, especially in group activities, and participating in team conferences around the child and general discussions of treatment. Opportunity for involvement with the schools, because some of the children are ready to go into a public school special education program. It also permits work with some of the parents and observation of the efforts to engage parents in working with their own children. Students also participate in the didactic exercises of the Division of Child Psychiatry. Prerequisite; Human Biology 465. (6 weeks, full time. Limit: one student.)

#### PBSCI

#### 464 Clerkship in Ambulatory Services, HCMHC (9) AWSp 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, Human Biology 465 and Psychiatry 465, or permission. Medical students; graduate students by permission.' (6 weeks, full time; 12 weeks; half-time. Limit: four students.)

#### PBSCI

#### 465 Clinical Clerkships (9 or 18) AWSpS Ely, Johnson

Closely supervised experience under an attending physician on a psychiatric inpatient ser-vice. The student is responsible for diagnostic evaluations of, and primary patient responsibility for, patients with a variety of psychiatric disorders at University Hospital, Harborview Medical Center, or Veterans Administration Hospital. He also receives emergency room service experience at Harborview Medical Center, which supplies numerous opportunities for crisis intervention methods. The student is introduced to the principles of the use of psychologic tests, ward milieu management, group psychotherapy, and the physical and pharmacological treatments. Clinical conferences with discussion of psychoses, psycho-neuroses, and psychosomatic disorders. Limited consultation and screening experience available. Third- and fourth-year medical students only. (Limit: eighteen students.)

# PBSCI

# 466 WAMI Psychiatry and Behavioral Sciences Clerkship (9) 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. (6 weeks, full time.)

# PBSCI

# 470 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

#### 475 Psychiatric Externship (\*) 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, 465. (Limit: four students.)

# PBSCI

#### 490 Adult Development Program (9 or 18) AWSpS

Armstrong, Bakker

In the Adult Development Program (ADP), the student functions as a team member. He is expected to participate in all the classes offered in the program. He functions as a consultant to a client assigned to him. He has opportunity to acquire experience with a wide variety of behavior change techniques, including group experiences, role playing, couples workshops, fixed-role workshop, etc. Prerequisite, Human Biology 465. (6 or 12 weeks; full time. Limit: three students.)

#### PBSCI

#### 491 Seminars and Conferences in Psychiatry (\*) AWSp Ripley

Special seminars and conferences on a variety of topics can be arranged to accommodate the particular interests of students. Prerequisite, permission.

# PBSCI

492 Behavioral Science Study Unit (\*) AW Masuda

A variety of topics is presented under the sponsorship of the Department of Psychiatry and Behavioral Sciences, with participation of faculty members from many departments of the total University as well as from the health sciences. When practicable, selected patients illustrate topics presented. Medical and graduate students. May be repeated for credit.

# PBSCI

# 493 Combined Psychiatry Clerkship (\*) 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

#### 495 Clerkship in Community Mental Health (9) AWSp

Nash

Elective that offers 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. In addition, each student is assigned part time to the outpatient clinic for psychotherapy experience and to the psychiatric emergency room of the Harborview Medical Center community mental health facility. The program is geared to the specific interests of each student. Third- and fourth-year medical students only. Prerequisite, Human Biology 465. (6 weeks, full time. Limit: three students.)

#### PBSCI

#### 496 Clerkship in Adult and/or Child Outpatient Psychiatry (\*) AWSpS

Anderson, Casey, Hampson

Full-time students divide their time between adult outpatient and child outpatient. Parttime 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 participate 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 pediatricpsychiatric liaison service and observe and work with children in a day-care setting or with children with learning problems of emotional origin. Both adult and child services offer supervision and didactic programs. Thirdand fourth-year medical students. (6, 8 or 12 weeks, full time; 4 or 5 half-days per week for 12 weeks, part time.)

#### PBSCI

#### 497 Psychiatry Special Electives (\*) AWSpS Eisdorfer

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisite, permission.

# PBSCI

#### 498 Undergraduate Thesis (\*) 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. (2, 4, or 6 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. (4, 6, or 12 weeks.)

# **Courses for Graduates Only**

#### 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 and graduate students.

#### PBSCI

#### 566 Biological Correlates of Psychiatry (2) Sp Heilbrunn

Anatomical and physiological factors involved in various forms of psychopathology. Medical and graduate students.

# RADIOLOGY

#### RADGY

#### 460 Introduction to Clinical Radiology (1) Sp Figley, Parker, Troupin

A basic clerkship in both diagnostic and therapeutic radiology designed to familiarize the student with clinical radiology and to expand and demonstrate application of knowledge acquired in the basic curriculum. Prerequisite, Human Biology 420.

#### RADGY

#### 477 Introduction to Radioactive Tracer Techniques (3) A

Robkin Introduces the student to the basic concepts of the use of radioactive tracers to measure the transfer between the compartments of a biological system. The theoretical analysis is restricted to systems with no more than three compartments. The experiments are designed to permit the student to utilize the theory discussed and to make actual determination of transfer coefficients. Offered jointly with the Department of Nuclear Engineering as Nuclear Engineering 477.

#### RADGY

#### 480 Nuclear Medicine 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

#### 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 the Department of Nuclear Engineering as Nuclear Engineering 487. Prerequisite, permission.

# RADGY

# 493 General Radiology Clerkship (3 or 6 or 9) AWSp

Troupin

Basic clerkship provides a survey of radiology, the depth and breadth of which are individually structured. Instruction and experience in radiation therapy and nuclear medicine is provided; however, the majority of the time is spent in the diagnostic department. Students observe and participate in ongoing film interpretation, fluoroscopy, and special procedures. A variety of X-ray and clinical conferences can be attended, supplementing daily film reading sessions and seminars with the staff. Opportunities for self-instruction are provided in the form of reading material and a large X-ray teaching file. A short experience in community radiology recently has been added to provide insight into radiologic care delivery in community practice. Prerequisite, Medicine 465 or Human Biology 465.

#### RADGY

#### 495 Clinical Cancer Management (\*) 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, Medicine 465 or Human Biology 465, or permission. (2 weeks.)

#### RADGY

#### 496 Nuclear Medicine Clerkship (\*) AWSpS Nelp

Student participates from 8:00 a.m. to 5:00 p.m. daily in the nuclear medicine clinical labora-

# R

tory, where diagnostic studies of various types are performed. The student has responsibility for examining patients and assists in the diagnostic or therapeutic procedure. He assists in ward consultation, attends daily clinical conferences, and participates in the ward rounds of the division. Prerequisite, permission. (2, 4, or 6 weeks.)

# RADGY

#### 497 Radiology Special Electives (\*) 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.

#### RADGY

#### 498 Undergraduate Thesis (\*) AWSp Figley

The student may write a thesis in either therapeutic or diagnostic phases of 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, organ, and organism levels with emphasis on mammalian systems. Prerequisite, permission.

#### RADGY

#### 503-504 Laboratory in Radiation Biology (1-1) A,W

Christensen

Laboratory study of the biological effects of ionizing radiation. Prerequisite, permission.

#### RADGY.

#### 505 Radiological Physics (3) W Wootton

Application of physical concepts methodology and instrumentation in the study, production, and mensuration of ionizing radiations and their interactions with biological materials. Prerequisite, permission.

#### RADGY

### 507 Radiation Hazards Analysis and Control (1) Sp

Baltzo

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

#### Christense

Discussion of radiation-induced chemical reactions and their contribution to biological radiation damage, including alterations in enzymes, viruses, bacteria, and mammalian cells. Prerequisite, permission.

# RADGY

517 Radiation Dosimetry (3) Sp Bichsel

Basic principles of the interaction of radiation with, and the energy deposition in, matter. Definition and measurements of radiation fields. Radiation transport. Prerequisite, permission.

# RADGY

520 Seminar (2)

May be repeated for credit.

#### RADGY

#### 540, 541 Nuclear Energy, Man, and His Environment I, II (3,3) 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 the Department of Nuclear Engineering as Nuclear Engineering 540, 541.

#### RADGY

550 Field Practice in Radiological Health (\*, max. 6) S

Christensen

Student rotates through laboratories engaged in radiological health and radiation safety work to gain experience in the problems encountered in practice. Prerequisite, permission.

#### RADGY

600 Independent Study or Research (\*)

AWSpS Prerequisite, permission.

# **REHABILITATION MEDICINE**

#### REHAB

#### 290 Pre-Occupational Therapy Clerkship (2) AWSp

Supervised observations and work participation with patients in local occupational therapy clinics concurrent with lectures on professional ethics concepts and major roles of the therapist, and on elementary techniques of occupational therapy. Prerequisite, permission.

#### REHAB

320-321 Medical Science (4-4) W,Sp Staffs of Departments of Medicine, Obstetrics and Gynecology, Orthopaedics, Pediatrics, Rehabilitation Medicine, Psychiatry and Behàvioral 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 roentgenology. Required for occupational therapy, prosthetics and orthotics, and physical therapy students, and rehabilitation counseling students. Offered on credit/no credit basis only.

#### REHAB

# 332 Pathologic Physiology for Physical Therapists and Occupational Therapists

(5) A

Anderson

Emphasis on normal and pathologic physiology of the circulatory, respiratory, central nervous, and musculoskeletal systems as basis for treatment in occupational therapy and physical therapy. Required for occupational therapy, physical therapy, and prosthetics and orthotics students; others by permission. Prerequisites, Biological Structure 301, Zoology 208 or 118, and permission.

#### REHAB

# 335 Engineering Concepts in Prosthetics and Orthotics (2) Sp

Kirkpatrick

Instruction in the physical principles that underlie modern prosthetic-orthotic devices and practice. Hydraulic control, material behavior, force analysis, and basic electronics are discussed, with emphasis on application to prosthetic-orthotic practice.

#### REHAB

#### 340 Spinal Orthotics (3) Sp Simons

Instruction in, and experience with, the use of orthotic components and materials, including layout, measurement, and fitting of 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 Extremity Prosthetics (8) W Simons

Instruction in, and experience with, the use of prosthetic components and materials, including preprosthetic care, prosthetic components, principles of fabrication and harnessing, and techniques of checkout and prosthetic training for all amputation types. Required for prosthetics and orthotics majors; others by permission. (Formerly 341-342.)

#### REHAB

#### 343 Upper Extremity Orthotics (6) S Simons

Instruction in, and experience with, the use of orthotic components and materials. Students evaluate and fabricate therapeutic and functional orthoses, including externally powered devices. Required for prosthetics and orthotics majors; others by permission.

#### REHAB

#### 380 Professional Relations in Occupational Therapy (2) W

Study of fundamentals applicable to all areas of occupational therapy; relationships of physical therapy, occupational therapy, nursing, rehabilitation counseling, social service, and other allied services in carrying out the team concept of a complete rehabilitation program. Prerequisite, occupational therapy student.

#### REHAB

#### 408 Tests and Measurements in Physical Therapy (4) Sp

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 evaluation. Laboratory. Required for physical therapy students.

# MEDICINE

#### UCONJ

#### 410 Study of Interdisciplinary Evaluation and Management of Håndicapped 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 intellectual and perceptual deficit on patient performance and treatment strategies. Required for physical therapy students; others by permission. Prerequisite, Psychology 100.

#### REHAB

#### 415 Undergraduate Seminar for Physical Therapy Students (1-2-2) A,W,Sp *McMillan*

Basic principles of medical ethics; history, scope of physical therapy; relationships of physical therapy, occupational therapy, nursing, rehabilitation counseling, social service, and other allied services. Required for physical therapy students. Offered on credit/no credit basis only.

#### REHAB

#### 416 Principles of Physical Therapy Administration (3) Sp Tratter

The nature of administration, economic trends, operational policy, aspects of supervision, ethical and legal influences applicable to a physical therapy department. Required for physical therapy students.

#### REHAB

#### 420 Lower Extremity Prosthetics I (8) A 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 Extremity 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

#### 422 Lower Extremity Prosthetics III (4) Sp Simons

Instruction in, and experience with, the use of prosthetic components and materials, including casting techniques and alignment procedures used for hip disarticulation patients, and the Symes prosthesis. Required for prosthetics and orthotics majors; others by permission.

#### REHAB

# 423 Lower Extremity Orthotics (8) A

Simons

Instruction in, and experience with, the use of orthotic components and material, including measurement and fitting of lower-extremity 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

#### 425 Child Amputee Prosthetics (3) Sp Simons

Instruction in, and experience with, the use of special prosthetic components and materials, including measurement and fitting of the patient with congenital anomalies. Required for prosthetics and orthotics majors; others by permission.

#### REHAB

## 427-428 Applied Prosthetics and Orthotics I, II (4-7) Sp,S

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, Zettl

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

#### 442 Advanced Clinical Kinesiology and Biomechanics (6) Sp Lehmann

Study of joint motion and muscle function in relation to both the normal and abnormal state. Specific techniques employed in the field of rehabilitation medicine are analyzed. Required for occupational therapy and physical therapy students; others by permission.

#### REHAB

# 444-445 Function of the Locomotor System (4-4) A,W

Lehmann

Functions of musculoskeletal system as applied to normal and pathologic patterns of motion. Emphasis on upper extremity, shoulder girdle, lower extremity, and trunk. Anatomy of peripheral-vascular and peripheral-nervous system. Required for occupational therapy students and physical therapy students; others by permission. Prerequisites, Biological Structure 301, Zoology 208 or 118.

# REHAB

### 446, 447 Anatomy Laboratory for Occupational Therapists (1,1) A,W

Nystrom

Study of musculoskeletal, peripheral-vascular, and peripheral-nervous systems from prosected material. Required for occupational therapy students.

#### REHAB

#### 451, 452 Anatomy Dissection for Physical Therapists (1,1) A,W *McGee*

Dissection of musculoskeletal, peripheralvascular, and peripheral-nervous systems. Required for physical therapy students.

#### REHAB

# 453 'First-Year Clinical Elective in Physical

Medicine and Rehabilitation (3) AWSp Emphasis on comprehensive evaluation of the patient, his disability, and the interaction of the patient and his disability with his environment. Experience in the use of physical therapy for various disabilities, discussion of the psychological aspects of disability, and the evaluation of the patient for ability to function are included. (10 weeks.)

#### REHAB

#### 454 Second-Year Clinical Elective in Physical Medicine and Rehabilitation (15 or 18) WS Kirby

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; reámbulation, 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, Human Biology 432, 453.

#### REHAB

#### 455 Neuromuscular Electrodiagnosis (2) 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, Human Biology 465.

#### REHAB

#### 459 Beginning Physical Therapy Procedures (2) A

Berni

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). Prerequisite, physical therapy student.

#### REHAB

#### 460 Beginning Physical Therapy Procedures (2) A

McGee

Introductory principles and concepts related to clinical physical therapy. Laboratory and clinical practice of basic physical therapy procedures in hydrotherapy. Application of physiological principles to clinical procedures. Prerequisite, physical therapy student.

#### REHAB

#### 461 Beginning Physical Therapy Procedures (2) W

Hertling

History of massage, methods of application, indications and contraindications, and physiological effects on various systems of the body. Laboratory. Prerequisite, physical therapy student.

# REHAB

#### 463 Modality Treatments (1-2, max. 2) WSp McGee

Theory, technique, demonstration, and practice in the use of the physical agents employed in physical therapy, which include thermotherapy,

actinotherapy, hydrotherapy, low-frequency and high-frequency currents. 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 Activities I (1-4) AWSp Laboratory study of the use of arts, recreation, and audiovisual aids, with emphasis on their therapeutic application to occupational therapy. Prerequisite, occupational therapy major.

# REHAB

# 469 Therapeutic Activities II (1-3) AWSp

Laboratory study of special skills in occupational therapy adjusted to meet the needs of the individual student. Prerequisite, occupational therapy major.

# REHAB

# 470-471-472 Therapeutic Exercise (3-5-2) A,W,Sp

Trotter

Methods of application, physiologic and therapeutic effects of exercises commonly used for treatment purposes in physical therapy. Opportunities are provided for supervised clinical practice of skills, and special attention is given to correlation of techniques to appropriate age level and handicap. New developments from the field are analyzed and evaluated. Required for physical therapy students.

#### REHAB

#### Administration and Supervision in 473 Occupational Therapy (3) W

Designed to introduce principles of organizing an occupational therapy department, its basic administrative principles and procedures, and an understanding of the functions of supervision. Prerequisite, occupational therapy major.

#### REHAB

#### 474 Pre-Vocational Evaluation and Exploration (2) W

Study of various types of prevocational programs; evaluation techniques, training procedures, and other considerations pertinent to job placement. Prerequisite, occupational therapy major.

# REHAB

#### 475 Physical Restoration (4) A Hertling

Instruction in theory and methods of physical restoration of the severely handicapped patient. Laboratory demonstration, practice, and supervised clinical practice in: selection, care, and use of wheelchairs, crutches, canes, walkerettes, and other assistive devices; special problems in the area of activities of daily living. Required for physical therapy students.

#### REHAB

#### **Prosthetic and Orthotic Evaluation and** 476 Use (2) A

Simons

Instruction in mechanical component substitution for functional losses. Emphasis is on biomechanical principle, prosthetic components, and alignment and fitting techniques. Required for physical therapy and prosthetics and orthotics students; others by permission.

# REHAB

# 477 Group Techniques (3) W

Experience in knowledge and understanding of self, group, and organizational behavior through participation in a learning group and through observation of patient groups. Focal point is directed around the use of activities. Prerequisite, occupational therapy major.

# REHAB

#### 479 **Rehabilitation Medicine Information in** Speech Pathology (3) A

Bollinger

Orientation information for speech pathology and audiology students in rehabilitation principles and techniques. Offered jointly with the Department of Speech as Speech 452. Lecture and clinical observation in all areas of rehabilitation, emphasizing cooperation and coordination of various professions in rehabilitation.

#### REHAB

#### 481 Principles in Occupational Therapy in Psychiatry (5) Sp

Preparation for defining, evaluating, planning, and administering an effective treatment program in psychiatric occupational therapy. Theories, treatment methods and media, and current research are explored. Clinical observations and practice under supervision required. Prerequisite, occupational therapy major.

### REHAB

482 The Process of Development (3) W Classroom and laboratory study of the development of man from infancy through old age, from the physical, psychosocial, perceptualmotor, cognitive, and cultural aspects. Emphasis is on developmental stages. Prerequisite, occupational therapy major.

#### REHAB

# 483, 484 Principles of Occpational Therapy in Physical Disabilities (4,3) A,Sp

Emphasizes the total rehabilitation of the physically disabled patient. Includes laboratory demonstrations and practice in assessment techniques, prosthetics, orthotics, and activities of daily living. New developments from the field are analyzed and evaluated. Prerequisite, occupational therapy major.

#### REHAB

#### 485 Basic Rehabilitation Medicine (3) AW Stolov

Combined outpatient, inpatient, and consultation experience, in which the human organism is studied as a social being. The concept of disease is broadened to include the external environment. The student learns the functional consequences in the environment of disease or impairment, the need for modifying the environment to support maximal function, and the impact of the illness or the disability on the people around the patient, in his environment. The concern is with the relationship of disability to work, social functioning, and leisure time. Prerequisite, Human Biology 465.

#### REHAB

#### Rehabilitation Medicine Clerkship-486 Pediatrics (6 or 9) 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, Human Biology 465; Pediatrics 465 recommended.

#### REHAB

#### Rehabilitation Medicine Clerkship-487 Medical (6 or 9) 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, Human Biology 465.

#### REHAB

#### 488 Rehabilitation Medicine Clerkship-Surgical (6 or 9) 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, Human Biology 465. (6 weeks.)

#### 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

#### 494 Field Experience (1-14, max. 14) AWSpS Harlock

Three months of directed and supervised clinical practice in occupational therapy clinics of the University Hospital or other affiliated hospitals. Required for occupational therapy majors. Offered on credit/no credit basis only.

#### REHAB

#### **Clinical Affiliation in Physical Therapy** 495 (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

#### **Rehabilitation Medicine Outpatient** 496 **Clinics (3) 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. and internal medicine. Prerequisite, Human Biology 465.

#### REHAB

#### **Rehabilitation Medicine Special Electives** 497 (\*) 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

498 Undergraduate Thesis (\*) Lehmann Prerequisite, permission.

#### REHAB

#### Undergraduate Research (\*) AWSpS 499 Lehmann

Students are given the opportunity to participate in clinical and basic research under the direct supervision of an instructor. Topics presently under study are: physiology of the locomotor system, effects of physical agents, and psychosocial-vocational aspects of disability. Common methods of the quantitative approach to basic and clinical problems as used in rehabilitation medicine are taught. Opportunities are given for the use of these methods in solving a research project. Prerequisite, permission.

# **Courses for Graduates Only**

#### REHAB

Specialized Clinical Experience in 500 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

Clayson, Lehmann

Review of the biophysical basis of physical agents, with emphasis on analysis of clinical problems encountered in physical therapy. Prerequisite, permission.

#### REHAB

#### 510 Somatopsychology: Psychological Aspects of Disability (3) Sp Fordyce

Psychological adjustment to disability; techniques of milieu management; application of conditioning techniques to treatment struc-turing; effects of intellectual and perceptual deficit; rehabilitation team management. Elective for majors.

#### REHAB

# 515 Therapeutic Media in Occupational

Therapy (3) Study of realistic, creative, and social activities as used in occupational therapy. Techniques of analysis, adaptation, and application of the media are investigated with accent on a realistic approach. For majors only.

#### REHAB

#### 516 Medical Information and Rehabilitation Counselors (4) Sp Clowers

Lectures in medical science field regarding the etiology, prognosis, and physical restoration of common disabling conditions. Case studies are used extensively, and major emphasis is placed on vocational implications of physical disability. Required for rehabilitation counseling students; others by permission.

#### REHAB

# 520 Seminar (1-5) AWSp

Conferences, seminars, discussions of advanced physical medicine and rehabilitation topics for residents and postdoctoral Fellows in rehabilitation medicine. Lectures, discussion, and laboratory work in selected aspects of occupational therapy appropriate to elected area of study for applicants for Master of Occupational Therapy degree. May be repeated for credit.

#### REHAB

#### Neurophysiological Basis for Neuromuscular Re-education (2) Sp 522 Anderson

Review of traditional concepts and an exposition of recent advances in neurophysiological research related to the practice of physical medicine. The mechanisms underlying facilitation techniques and other techniques used in neuromuscular re-education are examined. Prerequisites, resident M.D. standing and permission.

#### REHAB

#### 525-526 Approach to Treatment Strategies in **Occupational Therapy (4-4)**

Process of collecting, analyzing, and interpreting assessment data basic to formulating occupational therapy treatment objectives. Emphasis is placed on the importance of ascer-taining all ability requirements for human functional performance with the social, emotional, physical, and culturally handicapped. Prerequisites, occupational therapy major; 525for -526.

#### REHAB

#### **Medical Aspects of Vocational** 530 Counseling (3) A

Mott

Introduction to vocational implications of physical and emotional disabilities. Methods, counseling techniques, therapeutic modalities, community resources used in producing vocational assistance for the handicapped. Prerequisite. resident standing in rehabilitation medicine.

#### REHAB

#### 532 Clinical Affiliation for Rehabilitation Counselors (5-6) A

Under the general preceptorship of the rehabilitation counseling professional staff, the student counsels and evaluates patients who have severe physical, emotional, or social problems, ar-ranges for and administers vocational testing, obtains placement on job stations, and works with community resources in planning for vocational/educational placement after follow-up, and develops activity-oriented schedules. Prerequisite, permission.

#### REHAB

# Clerkship in Psychology of Behavior Change for Occupational Therapists 533 (5, max. 10) AWSp

Clerkship in application of occupational therapy techniques in a nonmedical setting. Prerequisite, permission.

#### REHAB

# 534 Normal Developmental Sequencing in Occupational Therapy (3) AWSp

Study of the motor, perceptual, cognitive, and social skills of the child from birth to ten years. Laboratory experiences include use of assessment tools and techniques, 'and detection of perceptiveness of parents' concerns. Prerequisite, permission.

#### REHAB

# 535 Physical Medicine and Rehabilitation

Administration (2-5) AWSpS Comprehensive analysis of the development of administrative processes in rehabilitation medicine. Theory and application in administrative and supervisory principles. Introduction of practical experience in clinical and academic situations. Offered to residents and postdoctoral fellows in rehabilitation medicine. Offered for Master of Occupational Therapy degree applicants.

#### REHAB

#### 540 Application of Measurement Systems (3) AŴSp Sand

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

# Assessment and Treatment of the Motor-Delayed Child in Occupational 542 Therapy (3, max. 9) AWSp

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 academician trainees. Prerequisite, resident standing in rehabilitation medicine; others by permission.

#### REHAB

#### **Electromyography for Occupational** 550 Therapists (3) AWSp

Introduction to clinical electromyography methods as a research tool through lectures, demonstrations, and practice sessions. Prerequisite, permission.

#### 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) Ś

Kraft

Comprehensive didactive 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

700 Master's Thesis (\*) AWSpS

# SURGERY

#### SURG

465 Clinical Clerkship (\*, max. 16) AWSpS Cantrell

Student is introduced to the diagnosis and the management of problems amenable to surgical therapy. A comprehensive program is offered that includes instruction in the physiological basis of surgical care, differential diagnosis and decision making, and the basic principles of surgical management. Active participation in the care of inpatients and outpatients, including participation in the operating rooms, provides practical experience in the application of these skills. Students are assigned to the surgical service of one of the major affiliated hospitals. Approximately twelve hours per week are devoted to seminars, conferences, and teaching rounds. The 'remainder of the time is spent working with assigned patients on the ward or in outpatient clinics, in the operating rooms, or in study. Students serve a significant role as a part of the total patient-care team. The course is designed to be of value to all students, regardless of their ultimate interests. The information presented serves as a basic fund of knowledge concerning an important therapeutic modality of nonsurgeons, and as a base for further study for prospective surgeons. Prerequisite, Human Biology 465. (6 weeks, full time. Limit: sixteen students.)

#### SURG

# 481 Peripheral Vascular Disease (3 or 6) 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. Prerequisite, Human Biology 465. (2 or 4 weeks, full time. Limit: two students.)

# SURG

# 482 Externship in General Surgery (\*) AWSpS

Cantrell

Permits the student to develop further his knowledge of surgical disease and to enhance his ability to manage comprehensively the problems encountered in surgical patients. Students function at the intern level under close supervision of the staff and house staff. Diagnosis, preoperative care, and postoperative care are stressed. The management of surgical emergencies and 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, 465. (4 or 6 weeks, full time. Limit: four students.)

#### SURG

483 Pediatric Surgery Externship (6 or 9) 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, 465. (4 or 6 weeks, full time. Limit: two students.)

# SURG

#### 484 Trauma and Emergency Care (3 or 6) AWSpS

Cantrell Students are assigned to the emergency department of Harborview Medical Center or Valley General Hospital or Overlake Memorial Hospital. Patients with acute illnesses or trauma are evaluated and treated in the initial

SURG

Limit: four students.)

#### 485 Cardiac Surgery Externship (\*) AWSpS Dillard

evaluation and emergency room. Prerequisite,

Human Biology 465. (2 or 4 weeks, full time.

Students actively engage in the care and treatment of inpatient and outpatient surgical cardiovascular cases. They work closely with the cardiovascular team on preoperative diagnostic studies, in the operating room, and in postoperative patient care. Prerequisite, 465. (6 weeks, full time. Limit: two students.)

#### SURG

# 486 Plastic Surgery Clerkship and Preceptorship (\*) AWSp

DeVito Students participate in all activities of plastic surgery service and staff at University Hospital and affiliated services. This includes patient work-ups, case presentations, operating room experience, and patient contact in the clinic. Prerequisite, Human Biology 465. (4 or 6 weeks, full time. Limit: one student.).

#### SURG

#### 497 Surgery Special Electives (\*) AWSpS Cantrell

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisites, 465 and departmental permission. (4, 6, or 12 weeks, full time.)

#### SURG

498 Undergraduate Thesis (\*) AWSpS Cantrell

Offered to those students who have engaged in undergraduate research in general surgery. (Full or part time.)

#### SURG

#### 499 Undergraduate Research (\*) AWSpS Cantrell

Provides the student with an opportunity to participate in ongoing research projects in general surgery being carried out by members of the faculty of the Department of Surgery or to carry out an independent research project under supervision. Practical experience in experimental design and execution is provided under the direct supervision of a selected faculty member. Analysis of results and formulation of a report are included. The experience gained in experimental techniques and equipment depends upon the project chosen. This course should be of value to any student, regardless of his goals, but should be of particular importance to academically oriented individuals. (Full or part time.)

# **Courses for Graduates Only**

# SURG

- 525 Seminar in Plastic and Maxillofacial Surgery (\*) 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, 465 and permission of department.

# CONJ

585 Surgical Anatomy (1-3, max. 12) (See Conjoint Courses.)

#### SURG

#### 590 Applied Surgery; Practical Management and Surgical Techniques (1) AW Mohri

Seminars and practical instruction in the surgical techniques applicable to major surgical diseases. The seminars stress an understanding of the relationship between the clinical manifestations of disease and the rationale of surgical procedures in terms of pathophysiology. Preoperative and postoperative care are considered. Surgical techniques are taught in the animal laboratory, each student functioning as both surgeon and assistant during the instruction. Students work in teams of three. Nine operations are carried out. A selected bibliography is provided. Prerequisite, 465. (Limit: nine, twelve, or fifteen students.) A (last six weeks) or W (first six weeks) only one afternoon a week.

#### SURG

600 Independent Study or Research (\*) AWSpS

# **UROLOGY** ~

#### CONJ

460 Clinical Research Center Clerkship (9 or 18)

#### (See Conjoint Courses.)

#### UROL

475 Urology Preceptorship (\*) AWSpS Kiviat

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, Human Biology 462. (2 or 4 weeks.)

#### UROL

480 Urology Clerkship (\*) AWSpS Ansell, Chapman, Correa, Kiviat, 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 semi-nars during the first two weeks, at the end of the clerkship the student gives a ten-minute talk on a urologic subject of his choosing. Prerequisite, Human Biology 462. (2 or 4 weeks.)

#### UROL.

#### Urology Subinternship (6 or 9) AWSpS 485 Ansell, Chapman, Correa, Kiviat,

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, Medicine 465 or Pediatrics 465, or permission.

#### UROL

#### 497 Urology Special Electives (\*) AWSpS Chapman, Correa, Kviat, 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. (6 or 12 weeks.)

#### UROL .

Undergraduate Thesis (\*) AWSpS 498 Ansell, Chapman, Correa, Kiviat,

Monda, Tremann

Provides an opportunity for medical students to write theses in the area of urology. Prerequisite, permission of sponsor and department.

#### UROL

#### Undergraduate Research (\*) AWSpS 499 Ansell, Chapman, Correa, Kiviat,

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.

# SCHOOL OF NURSING

# **Courses for Undergraduates** (Majors only)

NURS

281 Nursing Process I (6) WS

Beginning course in nursing process: systematic method of assessing human needs and maintaining optimal health. Theory, seminar, and clinical laboratory include application of the process to selected functional status abilities of patients in various clinical settings. Prerequisites, Chemistry 101, 102, Microbiology 301, Conjoint 317-318, Physical Education 205, Pharmacology 315, and Home Economics 319. Three hours theory, seminar: eight hours laboratory weekly. (First time offered: Winter Quarter 1975.)

#### NURS

#### 297 Human Development I: Conception Through School Age (4) WS

Development of assessment skills and knowledge basic to management of infants, preschoolers, school-age children. Study and practice in-clude 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. Prerequisites, sophomore standing and Con-joint 317-318. Two hours lecture, four hours laboratory weekly. (First time offered: Winter Quarter 1975.)

#### NURS

#### 298 Introduction to Normal Growth and Development (2) WS

Basic concepts and theories related to the physical, emotional, social, and cognitive development of children from infancy through preschool are considered. The student is directed to apply basic developmental knowledge to observation and assessment of children with concurrent implications of caretaking, and/or child health supervision stressed. Prerequisite, junior standing. Taken concurrently with 368 or 370. (Last time offered: Winter Quarter 1975.)

# NURS

#### 299 Introduction to Normal Growth and **Development (2) ASp**

Basic concepts and theories related to significant physical, emotional, and environmental factors in the developmental period from school age to young adulthood are emphasized. The student is introduced to major developmental deviations associated with learning and behavior. Prerequisites, junior standing, and 298. (Last time offered: Spring Quarter 1975.)

#### NURS

#### 300 Human Development II: Adolescence

Through Aging (4) ASp Further development of knowledge and skills established in 297. Study and practice include parameters of growth and development from adolescence, through early adulthood and middle age to old age; developmental tasks related to these age periods; environmental influences that affect maturation; contemporary life styles and developmental trends. Open to nonnursing majors with permission. Two hours lecture, four hours laboratory weekly. Prerequisite, 296. (First time offered: Spring Quarter 1975.)

# NURS

# 301 Principles of Patient Teaching (3) WS

Designed to provide the nursing student with some fundamental concepts of the learning and teaching processes as they apply to nursing practices. The laboratory sections are utilized to assist students in applying the concepts to the planning for teaching patients, family members, or auxiliary nursing personnel. One hour laboratory weekly. (Last time offered: Winter Quarter 1975.)

# 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 labora-tory weekly. Prerequisite, 281; 300 and 303 may be taken concurrently or before. (First time offered: Spring Quarter 1975.)

# NURS

#### **Psychosocial Care in Adaptive and** 303 Maladaptive Behaviors (5) ASp

Behavioral responses to social, psychological, and physiological factors. Rationale and techniques for care and treatment: crises intervention, chemotherapy, counseling. Contemporary issues in prevention and treatment. Open to nonnursing majors with permission. Prerequisites, 263, sophomore standing, and Psychology 100 or 101, or permission. (First time offered: Spring Quarter 1975.)

# 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 later with permission. (First time offered: Autumn Quarter 1975.)

#### 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. Prerequi-sites, 263, 300, 302, 303. Taken concurrently with 321 or later with permission. (First time offered: Autumn Quarter 1975.)

# NURS

# Nursing Care of Ill Adults and Children II (4) WS 323

Alteration of function in selected systems leads to broadening and deepening knowledge rele-vant 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. Prereq-uisites, 321, 322, or permission. (First time of-fered: Winter Quarter 1976.)

#### NURS

# 324 Nursing Care of Ill Adults and Children II Laboratory (\*) AWSpS Application of scientific principles in caring for

ill adults and children, with emphasis on identi-fication of common elements and significant differences in providing care for patients with increasingly complex health problems. Comprehensive nursing care includes experiences with persons in the acute care setting, the community, and nursing homes. Two hours clinical seminar, fourteen hours laboratory weekly. Prerequisites, 321, 322. Taken concurcurrently with 323 or later with permission. (First time offered: Autumn Quarter 1975.)

#### NURS

#### 325 Nursing Care of Ill Adults and Children III (4) ASp

Focus on alterations in function of specific systems in all age groups in the various phases of illness. The nursing process is retained as the organizational framework. The student is assisted to integrate understanding gained in preceding courses and to extend knowledge of illness dynamics. Prerequisites, 323, 324 or permission. (First time offered: Spring Quarter 1976.)

#### NURS

# 326 Nursing Care of Ill Adults and Children III Laboratory (8) ASp

Focus is on continuity of comprehensive nursing care of adults and children; understandings of theories and principles from previous courses are deepened; skills are increased, content areas are broadened and are more complex. Synthesis and application become the integral foci of critical thinking, clinical judgment, and evaluation in the nursing process. Two hours clinical seminar, fourteen hours laboratory weekly. Prerequisites, 323, 324. Taken concurrently with 325 or later with permission. (First time offered: Spring Quarter 1976.)

#### NURS

#### 351 Changing Concepts of Professional Nursing (4) ASp

Exploration of current concepts of nursing and nursing education including present and potential roles, responsibilities and required competencies of professional nurses in our society. Prerequisite, junior year in the registered nurse curriculum pattern. (Last time offered: Spring Quarter 1975.)

#### NURS

## 353 Scientific Basis for Nursing Actions (3) WS

Homeostasis, particularly as related to fluid and electrolyte balance, is used as an organizing concept in determining nursing actions in preventing, correcting, and controlling disease. Prerequisites, 351 and junior year in the registered nurse curriculum pattern. (Last time offered: Summer Quarter 1975.)

#### NURS

#### 354 Comprehensive Maternal-Child Nursing (4) ASp

Current theories, concepts, and principles applicable to maternal-child nursing. Emphasis on application of relevant principles from the humanities, natural and social sciences, and psychiatric nursing. Six hours of clinical laboratory weekly. Prerequisites, junior year standing in the registered nurse curriculum pattern, and 353. (Last time offered: Autumn Quarter 1975.)

#### NURS

#### 356 Comprehensive Medical-Surgical Nursing (4) WS

Theories, concepts and principles in assessing, planning, and evaluating the nursing care of selected adult medical-surgical patients. Emphasis on prevention, rehabilitation, continuity of care, and application of science principles. Six hours of clinical laboratory weekly. Prerequisites, junior year standing in the registered nurse curriculum pattern, and 351 and 353. (Last time offered: Winter Quarter 1976.)

#### NURS

#### 358 Psychiatric Concepts for Nursing Actions (4) ASp

Theory and clinical experience in application of selected concepts in interactions with patients with 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, 353 and junior year standing in the registered nurse curriculum pattern. (Last time offered: Autumn Quarter 1975.)

# NURS

#### 361 Cultural Variation and Nursing Practice (3) 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. (First time offered: Autumn Quarter 1975.)

#### NURS

#### 367 Family-Centered Maternal and Infant Nursing (4) AWSpS

Basic concepts and nursing principles in family-centered maternity care of women before, during, and after childbirth, and infants in the neonatal period. Prerequisites, junior year standing in the basic curriculum pattern and 368 taken concurrently. (Last time offered: Spring Quarter 1975.)

#### NURS

#### 368 Laboratory in Maternal and Infant Nursing (5) AWSpS

Utilization of basic concepts and nursing principles in providing family-centered nursing for women before, during, and after childbirth, and for infants in the neonatal period. Fifteen hours laboratory experience per week. To be taken concurrently with 367. (Last time offered: Spring Quarter 1975.)

### NURS

#### 369 Family-Centered Nursing of Children (4) AWSpS

Basic concepts and nursing principles in family-centered care of children. Emphasis on health needs of children and families from infancy through adolescence. Includes health supervision and common illnesses and disabilities. Prerequisites, junior year standing in the basic curriculum pattern and 370 taken concurrently. (Last time offered: Spring Quarter 1975.)

#### NURS

#### 370 Laboratory in Nursing of Children (5) AWSpS

Utilization of basic concepts and nursing principles in providing family-centered nursing for children in health supervision and during illness and disability. Fifteen hours laboratory experience per week. To be taken concurrently with 369. (Last time offered: Spring Quarter 1975.)

#### NURS

#### 371 Principles of Medical-Surgical Nursing (4) WS

Understanding of the scientific and nursing facts and principles that can be used to identify appropriate nursing interventions when caring for patients with selected medical and surgical conditions. Prerequisites, junior year standing in the basic curriculum pattern, 229, 260, and basic science courses, or permission. To be taken concurrently with 372. (Last time offered: Winter Quarter 1975.)

#### NURS

#### 372 Medical-Surgical Nursing Practice (5) WS

Application of scientific and nursing principles to the care of adult m dical and surgical patients. The problem-s lving approach is used with the major emphasis placed on helping the student learn how to analyze and interpret information she obtains from her own observations and other sources, decide on a course of action, carry out the plan, and evaluate the outcome. Patient care and clinical conferences are selected to coordinate with the content of 371. When feasible, patients are assigned for a number of days so that changes may be observed and the effect of care evaluated. Three weeks experience in the operating room in this course or in 374. Prerequisites, junior year standing in basic curriculum pattern and 371 taken concurrently. (Last time offered: Winter Quarter 1975.)

#### NURS

### 373 Principles of Medical-Surgical Nursing (4) ASp

Understanding of the scientific and nursing principles essential 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. (Last time offered: Spring Quarter 1975.)

#### NURS

#### 374 Medical-Surgical Nursing Practice (5) ASp

The broad aim is to help the student apply scientific and nursing principles to the care of adult medical and surgical patients. The identification of common elements and significant differences in the care of complex medical-surgical patients is stressed. The problem-solving approach is continued, Patient care and clinical conferences are selected to coordinate with the content of 373. Three weeks experience in the operating room in this course or 372. Fifteen hours weekly clinical laboratory. Prerequisites, junior year standing in the basic curriculum pattern, 371 and 372, or permission. To be taken concurrently with 373. (Last time offered: Spring Quarter 1975.)

#### NURS

#### 400 Family-Centered Maternal and Child

Nursing in the Community (6) 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. Prerequisites, 325, 326. (First time offered: Spring Quarter 1976.)

#### NURS

#### 401 Maximizing Health in the Community (9) WS <sup>t</sup>

Emphasis on ecological, epidemiological, social, mental, and selected community health problems and the nurse's role in promoting optimal health conditions. Approximately half clinical time spent caring for the mentally ill. Two hours lecture, fourteen hours laboratory weekly. Prerequisites, 325, 326, 400. (First time offered: Winter Quarter 1977.)

# NURS

### 405 Care Systems Analysis (3) AWSpS

Comparative analysis of past, current, and emerging health care systems and their effect on

# NURSING

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. (First time offered: Autumn Quarter 1976.)

# 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 from Sociology 223, EDPSY 490, or Biostatistics 472. (First time offered: Spring Quarter 1976.)

#### NURS

#### 409 History and Trends of Nursing (3) AWSp

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) AWSp

For course description, see "Interschool or Intercollege Programs."

#### NURS

#### 412 Scientific Principles in Nursing Care (3) AWSpS

Undergraduate seminar devoted to critical analysis of selected nursing situations, with identification of the natural and behavioral science principles that guide nursing actions. Prerequisite, senior standing in the School of Nursing. (Last time offered: Summer Quarter 1976.)

#### NURS

#### 413 Principles of Psychiatric Nursing (5) AWSpS

Concepts and principles of psychiatric-mental health nursing used in planning care of men-tally ill patients. Psychological and sociocultural dynamics of mental illness. Nursing approaches and interviewing techniques. The classification of mental illness, the signs and symptoms, and the treatment approaches are presented. Prerequisites, senior standing in the School of Nursing, and 414 taken concurrently. (Last time offered: Summer Quarter 1976.)

#### NURS

414 Psychiatric Nursing Practice (5) AWSpS Application of psychiatric-mental health principles and skills in the care of selected psychiatric patients. Prerequisites, senior standing in the School of Nursing and 413 taken concurrently. Fifteen hours clinical laboratory weekly: (Last time offered: Summer Quarter 1976.)

#### NURS

#### **Community Health Nursing Principles** 415 (3) AWSpS

Concepts and principles of community health nursing used in analyzing and implementing health programs in family and community set-tings. Prerequisites, senior standing in the School of Nursing and Health Services / 323. (Last time offered: Summer Quarter 1976.)

#### NURS

#### 416 Community Health Nursing Practice (5) AWSpS

Application of community health nursing principles and skills in family and community health situations. Problem-solving and interpersonal relationship skills emphasized. Fifteen hours a week, including two hours of conference. Prerequisites, senior standing in the School of Nursing and 415 taken concurrently. (Last time offered: Summer Quarter 1976.)

#### NURS

#### **Special Fields of Community Health** 420 Nursing (3-8) A

Practicum devoted to nursing responsibilities in special fields such as school health nursing or occupational health nursing. Emphasis and recedit of course varies with the interest and needs of the student. Weekly conference, Nine to twenty-four hours, including two hours of conference. Prerequisites, 415, 416, or equivalent, postbaccalaureate standing in the School of Nursing.

#### NURS

421 Nursing Leadership (4) AWSp Major focus is directed toward the student's understanding of the leadership role of the professional nurse as a beginning practitioner in organized health care services. The leadership role of the professional nurse, changing trends in organized health care services in our society, and the change agent's role of the professional nurse are emphasized. Prerequisites, senior standing in the School of Nursing, and 422 taken concurrently. (Last time offered: Summer Quarter 1976.)

#### NURS

# 422 Senior Clinical Nursing (6) AWSp

Experience in providing care for a group of patients with complex nursing care problems. Planning, directing, guiding, implementing, and evaluating nursing care as an individual and as a member of the health care team. Eighteen hours clinical laboratory weekly. Prerequisites, senior standing in the School of Nursing, and 421 taken concurrently. (Last time offered: Summer Quarter 1976.)

#### NURS

#### 423 Nurse Practitioner in Special Fields (15)

Further development, critical examination, and synthesis of nursing care in specialized area with focus upon practice, leadership skills, application of selected theoretical concepts, research findings and assessment of issues, problems, and forces impinging upon quality of care and health delivery modes. The student selects a specialized area for clinical experience in an urban or rural setting. Four to eight lecture hours. Twenty-one to thirty-three laboratory hours weekly. Prerequisites, 401 and senior standing. (First time offered: Winter Quarter 1977.)

#### NURS

#### 429 Nursing Functions in Gerontology (2) AWSpS

Aging as a normal developmental process; the problems of the aged; the community resources available; and the derivation of implications for nursing care of aged persons from gerontological concepts. Prerequisite, senior standing in the School of Nursing. (Last time offered: Summer Quarter 1976.)

#### NURS

#### 499 Undergraduate Research (1-5, max. 5) AWSp8

Supervised individual research on a specific nursing problem. Prerequisites, junior year standing in the School of Nursing, cumulative grade-point average of 3.00 or better, and permission.

#### **Courses for Graduates Only**

#### NURS

#### 430 Field Study in Maternal and Child Nursing (3) W

Barnard, Rose

Guided clinical experience in maternity nursing or in nursing of children with emphasis on the family. Includes diagnosing nursing problems, applying theoretical concepts, and evaluating results. A minimum of seven hours of guided experience weekly.

# / NURS

# 431 Field Study in Maternal and Child Nursing (3) Sp

Rose, Vandeman The experience may be a continuation in the

clinical area chosen in 430 or may be the alternate area. A minimum of seven hours of guided experience weekly.

# NURS

#### Practice Teaching in Maternal and Child 438 Nursing (3) S

Rose

Guided experience in selected teaching-learning situations in clinical nursing. Identification, analysis, and solution of teaching-learning problems in clinical nursing. A minimum of seven hours of guided experience weekly, Prerequisites, 430, 431, 524, 530.

#### NURS

#### 446 Practice Supervision in Nursing Service (3) S

Aeschliman

Guided experience in supervisory functions. Identification, analysis, and solution of selected supervisory problems in clinical nursing.

#### NURS

#### **Advanced Field Work Community** 450 Health Nursing (2) W Pittman

Guided experience in identifying nursing problems, identifying rationales for implementing nursing therapy, and evaluating results in selected situations in community health nursing. An application of core concepts presented in 523. A minimum of four hours of guided experience weekly. Prerequisite, 523.

#### NURS

# 451 Advanced Field Work Community Health Nursing (2) S

Farrand, 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, Farrand, 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. Prerequisites, 450 and 451.

#### NURS

#### 456 Nursing Service Administration (3) W Aeschliman

Considers philosophies, purposes, and elements of administration as applied to organized nursing services. Concepts related to administrative behavior, the organization and delivery of services, and the management of personnel are explored. Emphasis on critical analysis of current literature and analysis of administrative problems in nursing. Prerequisite, 524.

#### NURS

#### 458 Practice Teaching Community Health Nursing (3) Sp

Cobb

Guided experience in selected teaching-learning situations in community health nursing. Identification, analysis, and solution of teaching-learning problems. A minimum of seven hours of guided experience weekly. Prerequisite, 450.

#### NURS

#### 460 Seminar in Interpersonal Approaches in Nursing (2) W

Larson Theoretical basis for interpersonal process in the treatment of maladaptive behaviors. Synthesis of nursing intervention, based on concepts in psychiatric 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

MacElveen

Consideration of various media through which behavior can be observed and recorded, identification of behavioral units and patterns for analysis; implications for therapy, education, and research are included. Laboratory experience focuses on the development and utilization of skills for recording overt behavior. Exploration of new approaches is encouraged.

# NURS

#### 464 The Community and Mental Health: Theory and Research Foundations (3) A *MacElveen*

Designed to examine the contributory factors related to mental illness and mental health. Comparison of numerous indices of mental illness and mental health, including those employed in cross-cultural studies. Conceptions of community are contrasted and critiqued. The content includes the impact upon mental health and mental illness of values, ethnic and racial differences, social status differences, and other defined group dimensions. Natural social groupings are investigated and examined as a facet of community structure.

#### NURS

#### 465 Practice Supervision in Psychiatric-Mental Health Nursing (3) A

Poulsen

Guided experience in practice supervision in psychiatric nursing. Opportunity to supervise a nurse-patient relationship with assessment and written evaluation of the nurse's performance in the relationship. Literature on nursing supervision and consultation. A minimum of six hours of guided experience weekly. Prerequisite, 460.

# NURS

#### 466 Continuing Education in Nursing (3) Hicks

Planning, developing, and evaluating continuing education programs in various institutions and agencies. Includes the application of adult learning principles to a variety of situations, such as workshops, in-service and staff development programs. Prerequisite, graduate student.

# NURS

#### 467 Evaluation of Performance in Nursing (3) SpS

Philosophy and rationale of evaluation of nurses with administrative, teaching, and supervisory responsibility in various health agencies. The purposes of evaluation as they relate to guidance of students or staff toward personal satisfaction and growth in one's work, and to improved patient care.

#### NURS

#### 468 Practice Teaching in Psychiatric-Mental Health Nursing (3) A Larson

Guided experience in selected teaching-learning situations in clinical nursing. Identification, analysis, and solution of teaching-learning problems in clinical nursing. Evaluation of progress. Prerequisites, 460 and 464. A minimum of six hours of guided experience weekly.

#### NURS

#### 470 Practicum in Interpersonal Approaches in Nursing (2-6) WSp

Larson

Supervised experience in working with individuals to aid them in prevention and resolution of their emotional problems. Guided experiences in individual therapy approaches are oriented toward assisting the individual to identify and alter maladaptive behaviors. Prerequisites, 460 or equivalent, completed or taken concurrently, and permission.

#### NURS

# 488 Effects of Alcohol and Its Relation to Health and Disease (3) ASp

Heineman, Woodson

Intensive inquiry into the effects of alcohol on the total person with emphasis on the physiological effects, utilizing case studies, research reports, and audiovisual materials. Focus is on studying methods used in the assessment of patients, in patient management, and in evaluation of therapeutic intervention. Open to students in other disciplines. Prerequisite, permission.

#### NURS

#### 489 Alcohol Problems in Family and Society (3) W

Estes

Analysis of significant problems experienced by the family in the presence of alcoholism, with emphasis on sociocultural and psychological influences and related physiological implications. Theories of prevention and counseling are examined. Case studies and clinical presentations are utilized, and serve to synthesize learning in the process of nursing intervention. Open to baccalaureate students of junior and senior standing and to students in graduate programs.

#### UCONJ

#### 490 Social Sensitivity in Health Care (3) AWSp

For course description, see "Interschool or Intercollege Programs."

#### NURS

#### 495 Child Rearing, Culture, and Health (3) Sp Byerly

Cross-cultural study of the child-rearing practices, cultural norms, and health behavior of children and adolescents in different societies. Comparative approaches, diverse theoretical postures, and empirical research findings are used to study socialization practices and their relationship to cultural, social, and health systems of selected cultures. Offered jointly with the Department of Anthropology as ANTH 440. Prerequisite, permission.

#### NURS

#### 502 Applied Group Development Principles (3) AWSp Poulsen

Evaluation of selected theoretical concepts relating to dynamics operating in groups; analysis of process and development of skills to increase group productivity through class and laboratory sessions.

#### NURS

#### 505 Seminar in Administration of Schools of Nursing (3) Grav

Application of principles of administration to schools of nursing. Case method with discussion and analysis of situations presented. (Not offered 1974-76.)

#### NURS

506 Seminar in Nursing Service

Administration (3) 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) AS Poulsen

Analysis of literature on crisis, skills of intervention, and family structure and interaction. The family is seen as one example of a group, and family role relationships, role disruption, and interaction process are basic concepts by which families are assessed. Sociocultural forces external to the family are examined.

#### NURS

#### 508 Historical and Contemporary Perspectives in Personality Theories (3) AW Graves

Social history is examined as it influenced and was influenced by selected personality theories. A comparative analysis of psychoanalytic, learning, and philosophical personality theories with emphasis on orientations toward health, illness, and treatment.

#### NURS

#### 509 Practice Teaching in Physiological Nursing (3) SpS

Geitgey

Guided experience in selected teaching-learning situations in nursing, in both classroom and clinical situations. Identification, analysis, and solution of teaching-learning problems in clinical nursing. Minimum of seven hours of guided experience weekly. Prerequisite, 540. (Formerly 448.)

#### NURS

# 510 Curriculum Development in Nursing Education (3 or 5) WSp

Wolf

Theoretical rationale for curriculum development, study of curricular problems in nursing in relation to the elements of the curriculum as described in a curricular design. The 5-credit plan includes the development of a curricular plan in a simulated faculty group.

# NURS

#### Psychosomatic Nursing (3) WS 511 Graves

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) W

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. Preparation for community mental health nursing includes study of multidisciplinary relationships, community organization, and psychi-atric traditions that inhibit or potentiate community mental health programs. Evaluation of community mental health programs and social action strategies are examined. Observations of community processes or agency activities rele-vant to understanding of community mental health nursing.

# NURS

#### 513 Seminar in Group Treatment (2) SpS 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

Osborne 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

#### Topics in Nursing and Pharmacy (2) Sp 515 Graves, E. Plein

Readings and discussions of assigned topics of current interdisciplinary interest in the fields of nursing and pharmacy. Offered jointly with the School of Pharmacy as Pharmacy Practice 515. Subject matter changes from year to year. Prerequisite, permission.

#### NURS

#### 516 Theory of Child and Adolescent **Psychiatric Nursing (3) WSp**

Extension and refinement of child and adolescent psychiatric nursing; the psychodynamics and psychosocial maladaptions of childhood, adolescence, and parenthood; behavior dis-orders, learning disorders, and organic conditions with concomitant emotional reactions. Seminars, lectures, and discussions relate to assessing the psychodynamics of the various psychiatric and social disorders.

#### NURS

#### 517 Therapeutic Approaches: Child and Adolescent Psychiatric Nursing (2) SpS Eggert

Content focuses upon exploration of primary and secondary prevention of emotional dis-turbances in children and adolescents as well as the role of the nurse in maintenance of mental health in families. Various treatment modalities are examined. Prerequisite for 518.

# NURS

#### **Practicum in Child and Adolescent** 518 Psychiatric Nursing (2, max. 6) SpS Eggert

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.

#### NURS

#### 520 Methods of Research in Nursing (3) ASp Batey, Disbrow, Nakagawa

Research process as it applies to nursing. Use of the literature in building theoretical rationale. Selection of appropriate methods. Presentation of findings. A minimum of two laboratory hours weekly. Prerequisite, a course in statistics.

#### NURS

#### 521 Methods of Research in Nursing (2) WS Batey, Disbrow, Nakagawa

Continuation of 520, with emphasis on meth-ods of research applied to the solution of problems in all fields of nursing.

#### NURS

#### 523 Seminar in Therapeutic Nursing Process I (3) AS

Crowley, Jones, Pittman, Worthy 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 two laboratory hours weekly required.

#### NURS

# 524 Seminar in Nursing Leadership Processes (3) ASp Benoliel

Considers the dynamic processes involved in leadership roles assumed by nurses in a variety of settings. Included in the course is an exploration of the complex human relationships integral to leader functions in the attainment of health goals. A minimum of two laboratory hours weekly.

#### NURS

#### Seminar in Therapeutic Nursing 525 Process II (3)

Analysis and synthesis of concepts relevant to therapeutic nursing based upon a consideration of responses to crises and factors in health and illness. Library research and field study and a minimum of two laboratory hours weekly. (Not offered 1974-76.)

#### NURS

# 527 Practicum in Family Treatment (2-6) AWS

Poulsen Supervised experience as primary therapist or cotherapist in a family. Opportunities for pri-mary and secondary intervention in family crises. Supervision provided by nursing faculty member. Prerequisites, 502, 507, or equivalent, completed or taken concurrently, and permission

#### NURS

#### 529 Practicum in Group Treatment (2-6) ASpS

#### Larson

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

#### Theoretical Framework for Maternal and 530 Child Nursing (4) A

Vandeman

The theoretical basis for understanding nursing problems is explored in depth. A rationale is developed for making a nursing diagnosis and for assessing the role and function of nursing in the maternal and child nursing field.

#### NURS

# 535 Nursing the Child With Handicaps: Evaluation (3) ASp

Erickson Systematic observation and assessment methods designed to evaluate growth and development of newborns, infants, and the young child, and recognition of developmental delays associated with handicapping conditions. Enrollment limited. A minimum of four hours field study weekly. Prerequisite, permission.

#### NURS

#### **Operant Techniques in Modification of** 536 **Deviant Behavior (3) W** O'Neil

Systematic analyses of selected sequences of behavioral interactions among children, fami-lies, and health care personnel, and implemen-tation of programs designed to influence and evaluate behavioral outcomes. Enrollment limited. A minimum of four hours field study weekly. Prerequisite, permission.

#### NURS

#### Nursing the Child With Handicaps: Care 537 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

Worthv

Development of a framework for systematically evaluating parental behaviors in high-risk families and in families where there is a handicapped child, and for applying this knowledge to nursing interventions. The implications for nursing are derived from students' clinical experiences, as well as from theoretical content and relevant research findings. A minimum of eight hours field study weekly. Prerequisite, 537.

#### NURS

#### 539 Nursing the Child With Handicaps: Community (2) S

Erickson

Evaluation of essential components of re-sources 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 research come under review. A minimum of four hours field study weekly. Prerequisite, 538.

#### NURS

540 Seminar in Physiological Nursing (3) ASp Giblin, Mansfield, Walike

Factors influencing the pathophysiology underlying selected manifestations of physical illness. Implications for nursing diagnosis and for nursing therapy.

#### NURS

#### 541 Clinical Physiological Nursing Seminar I (3) AW

Crowley, Mansfield, Ware Guided experience in diagnosing nursing problems, identifying rationales for implementing nursing therapy, and evaluating results in selected situations in the clinical specialty. The general aim is to develop abilities in critical analysis of nursing problems of patients, in the design and implementation of plans of care, and systematic evaluation of outcomes of nursing actions. A minimum of seven hours of guided experience weekly. Prerequisite, 540. (Formerly 440.)

#### NURS

#### 542 Seminar in Cardiovascular Nursing (3) S Giblin

Systematic inquiry into the influence of physical and emotional factors on pathophysiology underlying selected cardiovascular conditions. Implications for management. The course is designed for nursing instructors, supervisors, consultants, and clinical specialists. Prerequisite, 540. .

# NURS

#### 543 Seminar in Nursing in Gerontology (3) Sp Patrick, Ware

Gerontological research findings applied to complex nursing problems in maintenance of health and maximum functioning in the aged. Prerequisite, permission.

# NURS

#### 544 Clinical Physiological Nursing Seminar II (3) WSpS

Crowley, Giblin, Mansfield, Ware

Continuation of 541. Guided experience in selected situations in area of clinical interest. A minimum of seven hours of guided experience weekly. Prerequisite, 541 or permission. (Formerly 441.)

#### NURS

#### 545 Special Topics in Physiological Nursing (2 or 3, max. 10) AWSpS Walike

Guided survey of the experimental literature of major topics in physiological nursing. Course conducted as a seminar with analysis and discussion of selected topics and readings. Implications for future research and health care are emphasized.

#### NURS

#### 546 Rehabilitation Nursing Seminar I (3)

Analysis of selected theoretical components underlying rehabilitation and utilization of scientific rationale in clinical nursing studies, with emphasis on prevention and maintenance. Library research and field study (a minimum of seven hours weekly) are required. Prerequisite, permission.

#### NURS

#### 547 Rehabilitation Nursing Seminar II (3)

Reconceptualization of theories of rehabilitadisabilities, with emphasis on supportive as-pects. Library research and field study (a min-imum of seven hours weekly) are required. Prerequisite, 546.

#### NURS

548 Rehabilitation Nursing Seminar III (3) Assessment of the nursing problems and direction of nursing therapies for groups of patients with a variety of disabilities, with special em-phasis on restorative needs. Library research, field study (a minimum of seven hours weekly), intradisciplinary and interdisciplinary conferences are included. Prerequisites, 446, 547.

#### NURS

549 Rehabilitation Nursing Seminar IV (6) Evaluation of nursing therapies used for rehabilitative problems in a variety of settings. Communication of pertinent rehabilitation nursing interventions. Library research and field study (a minimum of fourteen hours weekly) are required. Prerequisites, 546, 547, 548.

#### NURS

#### 550 Advanced Community Health Nursing (3) W

Pittman

Derivation of community health nursing concepts and principles. Identification of current and complex community health problems. Role of the nurse in their solution. Prerequisites, 415, 416, or equivalent, and Health Services 323.

#### NURS

# 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 Atkins

Examination of selected core concepts from anthropology and an assessment of the implications of these concepts for nursing research. Prerequisite, permission. (Limit: twenty students.)

#### NURS

#### Implications of Sociology for Research in 563 Nursing (3) W

Emerson 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 from microbiology. Exploration of particular aspects of those fields and of current research progress in microbiology. Prerequisite, permission.

#### NURS

570 Seminar in Clinical Research in Nursing (3) Sp Crowley

Philosophy, problems of design; use of criterion measures in terms of patient care. Prerequisite, permission.

#### NURS

571 Seminar in Nursing and the Social Order (3, max. 9) W Byerly

#### Changing patterns of nursing service and education in contemporary society. Implications of personal value systems. Prerequisite, permission.

# NURS

#### 572 Theory Building in Nursing (3) S Disbrow

Designed to help graduate students in nursing gain an increased understanding of the technique of theory construction, problems in-volved in theory testing, interdependence of theory and research, and implications of these for building a science of nursing. Prerequisite, permission.

#### NURS

#### 574 Selected Topics in Comparative Nursing Care Systems (2 or 3, max. 10) SpS

In-depth examination of the literature pertinent to major theoretical issues in cross-cultural nursing and health care systems. Course conducted as a seminar with analysis and discussion of selected topics and readings. Derivation of implications for research and health care is stressed. (First time offered: Spring Quarter 1975.)

#### NURS

#### 575 Death Influence in Clinical Practice (4) WS

Benoliel

Analysis and study of social, cultural, and psychological conditions that influence human death in modern society. Research findings, selected readings, and direct experience provide direction for examination of philosophic, theoretic, and pragmatic issues underlying choices and decisions in clinical practice. Open to graduate students with permission. (Limit: sixteen students.)

NURS

#### 576 Operant Techniques in Modification of Behavior (3) Sp **O'Neil**

Critical review of research related to the development of motor skills, language, and imitative behavior in the young child in order to facilitate the development of these skills in the child with handicaps. A minimum of four hours field study

weekly. Prerequisites, 536 and permission.

#### NURS

#### 578 Seminar in Cross-Cultural Nursing (3) Sp Byerly, Chrisman

Analysis, synthesis, and evaluation of selected theories from nursing and anthropology in application to the delivery of health care crossculturally. Includes a consideration of community study methods as they relate to the assessment of health needs, cultural beliefs about health, illness, and health-seeking be-haviors. Prerequisite for 579, the seminar provides the student with the opportunity to . articulate theory and method in planning the subsequent field experience in cross-cultural nursing. (First time offered: Spring Quarter 1975.)

# PHARMACY

#### NURS

#### 579 Field Course in Cross-Cultural Nursing (6) SA

Byerly, Chrisman Guided field practicum in application of concepts from cross-cultural nursing to health care delivery. Includes assessment of health needs and analysis of their relationships with cultural beliefs, collaboration with other health personnel in designing plans for care and evaluation of results. A minimum of eighteen hours field experience is required. Prerequisites, 578, which may be taken concurrently, 583, and permission. (First time offered: Summer Quarter 1975.)

# NURS

#### 583 Transcultural Nursing Practices (3) WS Byerly

Study of nursing practices in different cultures. Seminar focus is on theoretical formulations and comparative analysis of values, patterns, techniques, and practices of nursing care in many societies. Rituals, myths, taboos, and beliefs are studied in relation to the subculture(s) of caring and nursing practices.

#### NURS

600 Independent Study or Research (\*)

NURS 700 Master's Thesis (\*)

# SCHOOL OF PHARMACY

# PHARMACEUTICAL SCIENCES

#### PHSCI

#### 320, 321 Pharmaceutical Sciences Laboratory (3,2) A,W

Elmer, McCarthy

Laboratory demonstrates by experimentation basic analytical procedures and the properties of drugs in different physical and biological systems. Prerequisites, Chemistry 236; 320 for 321.

#### PHSCI

332 General and Physical Principles (3) W Lecture and laboratory present those physicalchemical properties of drug systems that have a significant effect on the therapeutic efficacy of drugs. Prerequisite, Pharmacy Practice 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, Chemistry 236 and Biology 212, or equivalents.

# PHSCI

#### 400 Biophysical Medicinal Chemistry (4) Sp Huitric, Trager

Principles of physical organic chemistry relevant to processes of drug distribution, transport, binding, elimination, specificity, and mechanism of action in general, and their relationships to these processes. Prerequisite, Chemistry 236 or 337 or equivalent.

## PHSCI

405 Biopharmaceutics and Pharmacokinetics (5) Sp

#### Levy

Lectures, conferences, and laboratory experiments on drug release from dosage forms, absorption from different routes of administration, and the resulting concentration time curves in blood and urine. Prerequisites, 332 and Pharmacology 402.

#### PHSCI

#### 412, 413, 414 Pharmacognosy (3,3,2) A,W,Sp Brady, Elmer

Medicinally and pharmaceutically useful products of plant, microbial, and animal origin. Biologic and chemical properties are emphasized. Prerequisites, Biochemistry 405, Biology 212, Chemistry 236, Microbiology 301 or 351, and 302.

#### PHSCI

#### 430 Inorganic Medicinal Products (3) Sp Krupski

Introduction to electrolyte and water balance and a discussion of selected groups of inorganic medicinal agents. Prerequisite, Physiol-. ogy and Biophysics 360.

#### PHSCI

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432 Bionucleonics Laboratory (3) Sp Spitznagle

Lectures, experiments, and demonstrations of radionuclide 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 Spitznagle

Presentation of factors considered in clinical diagnostic tests in respect to: biosynthesis, transport, distribution, catabolism, and excretion. The etiology associated with the test and the role of medication upon the clinical test value. Prerequisites, Physiology and Biophysics 360, and Biochemistry 405.

#### PHSCI

#### 440, 441, 442 Medicinal Chemistry (4,4,3) A,W,Sp

Huitric, 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, Chemistry 236 and Physiology and Biophysics 360.

#### PHSCI

445 Radiopharmaceutics (3) W

Spitznagle

Fundamentals of radioactivity; properties of radiation; instrumentation used in nuclear medicine; problems associated with the formulation, production, and use of radiopharmaceuticals; and a discussion of radiopharmaceuticals currently used for diagnosis and therapy. Prerequisite, 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 latentiation); molecular mechanisms of drug action; topics in drug design. Prerequisites, 442, Biochemistry 442 or 405, Pharmacology 443 or 402 or permission.

#### PHSCI

# 480 Advanced Medicinal Chemistry Laboratory (3) A

Huitric

Synthesis of important medicinal products. Prerequisite, permission. (Offered alternate years; offered 1975-76.)

#### PHSCI

# 490 Metabolism of Drugs (3) W

*McCarthy* Study of the processes of drug metabolism and their implications in modern therapy. The influence of metabolism on effect, duration, potency, use, and design of drugs is considered. Prerequisite, Pharmacology 402.

#### PHSCI

# 497 Toxicology (2) W

Krupski

Study of the properties and toxic effects of various substances used in medicine, as well as chemicals employed in industry and 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, Pharmacology 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 Hall, Hammarlund, Levy, E. Plein

Reading, conference, and laboratory work in physical pharmacy and biopharmaceutics. Pre-requisite, permission.

#### PHSCI

# 511, 512 Advanced Pharmaceutical Chemistry (3,3) A,W

Krupski

Chromatography, gas chromatography, ion exchange, and the use of various instruments for scientific investigations and determination of medicinal agents. (Offered every third year; offered 1974-75.)

#### PHSCI

#### 520 Seminar (1, max. 5) 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

Huitric, McCarthy, Nelson, Trager

Application of integrated data from the physical and biological sciences to problems of chemo therapy, including transport of drugs to site of action, biotransformation of drugs, and recent advances in drug design. Prerequisites, Chemistry 457, 531, and Biochemistry 442, or permission. (Offered alternate years; offered 1974-75.)

# PHSC

581 Topics in Pharmacognosy (1, max. 2) AWSp Brady

Discussions and readings of topics of current interest in the field of pharmacognosy. Subject matter changes from year to year. Prerequisite, reading knowledge of German.

# PHSCI

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.

#### 205 Introductory Pharmacy Laboratory (1) Sp

Introduction to pharmaceutical techniques. Recommended for freshmen. For majors only. Prerequisite, permission.

#### 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

# 328-329-330 Pharmaceutical Calculations (0-0-1) A,W,Sp

Hammarlund

Study of the practical calculations used in pharmacy. Offered on credit/no credit basis only. Prerequisite, third-year standing.

#### 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, Chemistry 236 and Physics 116.

#### PHARM

351 Fundamentals of Pharmacotherapeutics (3) Sp

J. Plein

Drug information resources; principles of pharmacology; pharmacologic and therapeutic classes of drugs with emphasis on characteristics of the classes and on clinically important prototype drugs. For nursing students. Prerequisites, Microbiology 301, 302; Conjoint -318, which may be taken concurrently, or permission.

#### PHARM

#### 407 Prescription Practice (4) A Hall

Study of the supply of drugs through prescription or other type of order. The interaction of the pharmacist with his clientele and other health professionals in the process of ordering, supplying, and encouraging the proper use of drugs. Prerequisites, 330, Pharmaceutical Sciences 405, and Pharmacology 402.

#### PHARM

#### 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, fifth-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 non-prescription remedies by the general public. Pre-requisite, 408.

#### PHARM

#### 420 Manufacturing Pharmacy (3) AW E. Plein

Technology of various dosage forms and the manufacture of pharmaceuticals on a smallplant scale. Prerequisite, Pharmaceutical Sciences 332.

#### PHARM

450 Pharmacy Laws (3) Sp Pittle

Study of the laws regulating the practice of pharmacy. These include federal, state, and municipal laws, and professional ethics. Prerequisite, fourth-year standing.

#### PHARM

#### 451 Pharmacy Administration (3) W

The business and management aspects of pharmacy. Economic considerations in independent and chain operations. A study of third-party payment plans for financing pharmaceutical service, government programs, public relations, professional promotion, and advertising. Sick room supplies, surgical and orthopaedic appliances are discussed. Prerequisite, 407.

#### PHARM

#### 452 Contemporary Problems (1) Sp Orr

Discussion of current trends affecting the role of pharmacy in health care delivery. Prerequisite, fifth-year standing. Offered on credit/no credit basis only.

#### PHARM

#### 465 The General Practice of Pharmacy (2, max. 4) AWSp

Study of pharmacy in the community and urban setting. Students spend variable periods under the tutelage of a pharmacist in his dayto-day practice and meet for weekly discussions of their experiences. Offered on credit/ no credit basis only. Prerequisites, Pharmaceutical Sciences 332 and permission.

#### PHARM

#### 470 Externship in Pharmacy (15) Sp Hall

Closely supervised study-experience period during which the student spends four weeks in each of three areas of pharmacy practicea hospital pharmacy, a community pharmacy, and an acute care (clinical) pharmacy service. In hospital and community pharmacies the student participates fully with a preceptor in active pharmacy practice. In the acute care service, the student participates in drug monitoring, patient instruction, consultation, and other applications of his knowledge to a clinical pharmacy service. The hospital and community segments may involve pharmacies anywhere in the state as instructional sites, while the acute care segment ordinarily makes use of the University-affiliated hospitals. Conferences on specific topics supplement work experience to blend academic knowledge into professional activity. Students in the externship are exempted from Pharmacy 452 as a graduation requirement. Offered on credit/no credit basis only. Prerequisite, permission.

#### PHARM

#### 483 Hospital Pharmacy (3-5) AWSpS E. Plein

Introduction to hospital pharmacy. Principles and techniques of hospital pharmacy operation. Laboratory work is conducted in pharmacies of University Hospital and affiliated hospitals. Prerequisite, permission.

#### PHARM

# 484 Introduction to Clinical Pharmacy (5) A

Ivey, Kradjan, E. Plein, Smith, Sorby Orientation to the clinical roles of the pharmacist and other health professionals and study of the more common diseases and their drug therapy. Considered 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, Pharmaceutical Sciences 405, 414, and 442.

#### PHARM

#### 485 Clinical Pharmacy (7) W

Ivey, Kradjan, E. Plein, Smith, Sorby Continuation of 484 with increased emphasis on the study of disease states and their drug therapy. Lectures and conferences stress application of basic pharmaceutical sciences to selection of drugs in patient care. Laboratories are conducted in various clinical areas of the hospital where students associate observed symptomology in patients with textbook descriptions of disease states, gain insight into problems of diagnosis and treatment planning, and relate disease states with drug therapy for specific patients. Two lectures, one conference, and three laboratory sessions per week. Prerequisites, 484 and permission.

#### PHARM

# 486 Clinical Pharmacy (4-10) Sp

Ivey, Kradjan, E. Plein, Smith, Sorby Continuation of 485 including lectures, con-ferences, 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 on 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 druguse 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 in-cluded. 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, Pharmaceutical Sciences 405 and permission.

# 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) AWSpŠ

Pharmaceutical research problems. Prerequisites, cumulative grade-point average of 2.50 and permission.

#### **Courses for Graduates Only**

#### PHARM

# 515 Topics in Nursing and Pharmacy (2) Sp E. Plein, Regan

Reading and discussion of assigned topics of current interdisciplinary interest in the fields of nursing and pharmacy. Subject matter changes from year to year. Offered jointly with the School of Nursing as Nursing 515. Prerequisite, permission.

#### PHARM

520 Seminar (1, max. 5) 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 1975-76.)

#### PHARM

#### 570 Hospital Pharmacy Administration (5) Sp

E. Plein

Organization and administration of the hospital pharmacy and the responsibility of the director of pharmacy services in a hospital. Prerequisite, permission. (Offered alter-nate years; offered 1975-76.)

#### PHARM

580 Advanced Manufacturing Pharmacy (5) Sp E. Plein

Study of the methods of manufacture of pharmaceutical preparations on a semicom-mercial scale. Prerequisites, Chemistry 457, which may be taken concurrently, and permis-sion. (Offered alternate years; offered 1974-75.)

# PHARM

600 Independent Study or Research (\*) AWSpS

PHARM

700 Master's Thesis (\*) AWSpS

# GRADUATE SCHOOL OF PUBLIC AFFAIRS

# **PUBLIC ADMINISTRATION Courses for Graduates Only**

#### PB AD

500 General Seminar (1, max. 9) AWSp (Formerly Public Policy 500.)

**PB AD** 

#### 501 The Administrator and the Policy Process (3) A Miller

Context of public administration from the perspective of the administrator. Through case and research materials, field inquiries and interviews, the manifold roles and functions of the administrator are examined, particularly as he relates himself and his work to the process of implementing, making, and changing public policy. Offered jointly with the Department of Political Science as Political Science 570.

#### **PB AD**

#### 502 Public Policy and Administration (3) W Miller

Interaction between the bureaucracy and those institutions, organizations, and groups involved in the policy process. Analysis of current policy problems is made from this perspective. Offered jointly with the Department of Political Science as Political Science 571.

#### PB AD

#### 503 Administrative and Executive Leadership (3) Sp

Nature of executive life in the public sector, the function of leadership in implementing, making, and changing policy. Leadership styles, the relation of leadership to its constituencies and communities. Offered jointly with the Department of Political Science as Political Science 572.

#### **PB AD**

505 The Law of Public Administration (3) Sp 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

#### **Administrative Problems:** 511 **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

# Administrative Problems: Macro-Organization (3) W 512

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.

# PUBLIC AFFAIRS

#### 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 Lyden, Pealy

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 Lyden

Study of line-staff decision making in acquisition and use of human resources in public organizations, including evaluation of job responsibilities, establishment of compensation levels, collective bargaining, selection and placement, performance appraisal, incentive management, and training.

# PB AD

#### 524 Organization Development in Public Agencies (3) Sp Miller

Examination of the philosophies, theories, and models of behavioral science interventions in organizational diagnosis and development (OD). In addition to a review of the basic literature dealing with the OD approach, emphasis is placed on examination of case studies and class experience in OD applications, including organizational diagnosis, problem confrontation, and team building. Prerequisite, permission.

# PB AD

#### 527 Quantitative Analysis (3)

Introduction to elementary research methodology and statistical analysis utilizing large- and small-scale computers; covering classical statistical topics such as correlation, regression, statistical estimation, sampling, probability, and data analysis. Emphasis is placed on using the computer for data analysis and statistical computation.

# PB AD

#### 528 Advanced Quantitative Methods in Public Administration (3) Sp Calhoun

Discussion of several important and current topics in operations research: optimization theory, simulation, time series analysis, Monte Carlo method, queuing theory, decision models, Markov processes, mathematical programming, and multiple regression analysis. The computer is used in an interactive classroom environment. Prerequisite, 527 or permission.

#### PB AD

541 Social Theory and the Public Policy Process (3) A Lyden

Approaches to the study of organizational behavior in a changing society, including consideration of formal and informal organization, personality needs, role playing, client relations, and sociopolitical and technological environment.

# PB AD

#### 542 Social Research and the Public Policy Process (3) W

Lyden

Survey of research evidence in the study of complex orgnizations and their environments, stressing development of analytic skills in the interpretation and the application of research results.

#### PB AB

### 543 Systems Theory and the Public Policy Process (3) Sp

Lyden

Survey of systems theory approaches to the study and the analysis of public organizations and their environments, including systems analysis, cybernetics, information theory, and general and social systems theory.

# PB AD

# 551 Comparative Administrative Systems (3) W

Kroll Methodological problems of research in comparative administration. Theoretical and substantive aspects of administrative systems in urban-industrial and developing nations. Offered jointly with the Department of Political Science as Political Science 579.

# PB AD

# 552 Administrative Problems of Development (3) Sp

Kroll

Problems of administering developing nationstates 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, Political Science 473, 474, or permission.

#### PB AD

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.

# 600 Independent Study or Research (\*)

# PUBLIC POLICY Courses for Graduates Only

# PB PL

#### 505 Health Policy and Medical Care (2) Sp Bergman

Interdisciplinary seminar designed to survey factors affecting health policy and programs. The subject is viewed by representatives of medicine, sociology, economics, political science, and others. Offered jointly with the School of Public Health and Community Medicine as Health Services 505. Prerequisite, permission.

#### PB PL

# 514 Program Evaluation (3) W Day, Williams

Examines the theory, practice, and politics of evaluation. All types of evaluative activities are considered, from simple feedback mechanisms to the evaluation of large-scale ongoing programs and social experiments, such as the New Jersey negative income tax experiment. Students are expected to gain familiarity with the basic principles of experimental design and the variations necessitated by their application in practical settings. Case studies are used to illustrate the various types of evaluation. Offered jointly with the School of Public Health and Community Medicine as Health Services 514. Prerequisites, adequate background in quantitative methods (e.g., Biostatistics, Health Services 512 or 513) and permission.

#### PB PL

#### 520 Federal Delivery Systems and Domestic Policy (3) Sp

Comparative study of the existing and proposed methods by which the federal government may deliver services or benefits. Students examine service programs administered by the federal government, grant programs, direct payment systems, voucher systems, block grants, revenue sharing, and tax deduction and credit systems. Selected programs are examined to determine probable impact on beneficiaries, intergovernmental relations, and program accountability. Political and constitutional limitations are also discussed. Prerequisite, permission.

#### **PB PL**

# 534 American Foreign Policy Formation (3)

Denny

American foreign policy viewed whole, including defense policy, the relationships of foreign policy to domestic policies and priorities, and the full range of historical, constitutional, institutional, political, and theoretical questions related to the formation and the execution of foreign policy in this broad sense. Offered jointly with the Department of Political Science as Political Science 534.

#### PB PL

# 535-536 Seminar in American Foreign Policy (3-3) W,Sp

Denny Foreign policy and defense policy formation and execution. Administration of national security programs, White House, Congress, state and defense departments, special problems, and case studies. Prerequisite, 534.

#### PB PL

#### 540, 541, 542 Social Management of Technology I, II, III (3,3,3) A,W,Sp

Wenk

Analysis of the interaction of technology and society through general principles and case studies of contemporary issues and public policy: the nature of the technological enterprise, its scientific base, ingredients of capital, specialized manpower, organizational structure and management; employment of public and private institutions; policy planning to generate, utilize, and manage technology so as to maximize opportunities and to minimize unwanted consequences; institutional conflicts; development of goals, strategies, program priorities, and policies; legal and economic considerations; processes of public decision making. Offered jointly with the Department of Civil Engineering as CIVE 540, 541, 542. Prerequisites, permission for 540; 540 for 541; 541 for 542.

# PUBLIC HEALTH AND COMMUNITY MEDICINE

# PB PL

# 556 Public Policy, Administration, and Democratic Theory (3) Sp

Examines the meaning of democracy in the context of American public policies and administration. The perspective of individual and group participation in the policy process. the individual's role in organizations, the functions of the public servant in the making of policy decisions, and the realities of policy formulation in relation to democratic values. Objective of the course is to enable the stu-dent professionally committed to public activity to reflect in a discussion setting upon his or her position as a participant in the society in which he or she works. Students and faculty determine the specific topics to be covered. Prerequisite, permission.

# PB PL

# 561, 562 Policy Development and

Administration: Urban Affairs (3,3) A,W A two-quarter graduate course in the structures, functions, and processes of government in cities, with special emphasis on the origin, content, and implementation of public policies. Major focus is on the political 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 adminis-tration, political science, and economics to examine urban public policies. Emphasis on the relationships between research and public policy. Prerequisite, Economics 416.

#### **PB PL**

#### 571, 572, 573 Public and Educational Policy Issues in the Development of Human Talent (3,3,3) A,W,Sp Wolfle

Higher education and the nation's human recources; trends, future projections, policy issues, and national and personal goals in the relations between education and the utilization of professional and specialized personnel. Stu-dents may do individual work on topics of special interest. Offered jointly with the Col-lege of Education as EDEPS 571, 572, 573. Prerequisite, permission.

#### PB PL

#### 583, 584, 585 Seminar in Science and Public Policy (3,3,3) A,W,Sp

Wolfle

Issues and problems relating to the interaction of science and scientists with the public policymaking process. Science versus the nature and values of political processes, and the continuing tensions between the two. The evolving interaction between scientific and technical knowledge and political power; scientific versus ethical judgments. Role of science in the establishment of national goals. Plans and proposals for increasing governmental competence to deal with public policy issues involving science and technology.

#### PB PL

# 590, 591, 592 Midcareer Seminar (3,3,3) A,W,Sp

Miller

Interdisciplinary seminar in public policy for midcareer executives. Open to participants in the Education for the Public Management Program; others by permission.

#### PB PL

#### 593, 594, 595 Policy Development and **Administration: Natural Resources** (3,3,3) A,W,Sp

# Crutchfield, Marts, Pealy

Interdisciplinary research seminar in natural resources policy development and administration. Major concern is with the processes of natural resources policy formulation and analysis, and the role of various sectors in influ-encing policy development and administration. Open to graduate and professional students in varied disciplines who are emphasizing preparation in natural resources fields. Prerequisite, permission.

#### **PB PL**

#### 596 Social Policy Analysis (3) Sp Williams

Examines the techniques and methods required in social policy analysis, including the technical issues in developing, using, and interpreting research relevant for social policy and bureaucratic problems in using research and analysis in the policy process. Designed to aid future administrators and analysts in performing policy analysis and in working with researchers to develop relevant studies and with the agency bureaucracy to integrate research and analysis. Prerequisite, permission.

#### **PB PL**

600 Independent Study or Research (\*) AWSpS

#### PB PL

#### 604, 605, 606, 607 Degree Project (2-6,2-6, 2-6.2-6)

The following economics courses serve as an integral part of the Graduate School of Public Affairs curriculum.

#### ECON

#### 392 **American Indian Economic Development** Problems (5) W Trosper

Study of the economic problems faced by native Americans. Primary emphasis on the management of reservation resources, particularly those resources important on reservations in the northwestern United States. Secondary emphasis is on the study of the integration of Indian workers into the general labor force of the United States. Prerequisite, 200 or equivalent or permission.

#### ECON

#### 400 Fundamentals of Micro-Theory (3) A Hashimoto

Fundamentals of 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

#### Urban Economics (5) ASp 416

Trosper Examines what is happening in urban areas. Use of economic analysis to explain urban trends; urban government organization; and problems of housing and renewal, transportation, poverty and race, and the environment.

Offered jointly with the Department of Geography as Geography 416. Prerequisite, 300 or 400, or equivalent.

#### ECON

#### 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 re-source 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

#### 448 Economics of Labor and Human Resources (5) Sp

Hashimoto

Economic analyses of policy related topics in human resources. Topics include labor demand and supply, education and occupation, wage structures, and income inequality, discrimina-tion, and poverty. Prerequisite, equivalent of 400 or permission.

# ECON

#### 451 State and Local Public Finance (3) W or Sp

Analysis of state and local government revenue sources and consequences of their use. Includes taxation, user charges, debt finance, and intergovernmental fiscal relations. Emphasis on metropolitan finance problems. Prerequisite, 201, 400 or equivalent.

#### **ECON**

#### 452 **Economic Approaches to Political** Analysis (5) W

Application of economic theory and methodology to political phenomena. Emphasis on theory construction with application in American context. Offered jointly with the Department of Political Science as Political Science 416, Prerequisites, 201, 400, or equivalent.

#### **ECON**

#### 553 Economic Analysis and Government Programs (3) Sp McCaffree

Application of economic analysis to public enterprises and programs. Prerequisites, 400, 401, or equivalent.

# SCHOOL OF PUBLIC HEALTH AND COMMUNITY MEDICINE

# BIOSTATISTICS

# **Courses for Undergraduates**

#### PC BS

410 Principles of Communicable Disease Control and Biostatistics (2) 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 the Department of Epidemiology and International Health as Epidemiology and International Health 410. Prerequisite, Health Services 323.

#### PC BS

# 472 Applied Statistics in Health Sciences (3) AWSp

Diehr, Kanarek, Wahl

Application of statistical techniques to biological and medical research; design and interpretation of experiments.

#### PC BS

476 Sample Survey Techniques (3-5) Sp

Methods appropriate to conducting and analyzing results of sample surveys. (Offered when demand is sufficient.)

#### PC BS

#### 477 Statistical Methods in Biological Assay (3) W

Feigl, Fisher

Statistical principles of experimental design applied to biological assay. Techniques of analysis of dose-response data. Prerequisite, Biostatistics 472 or permission. (Offered alternate years; offered 1974-75.)

#### PC BS

#### 478 Application of Vital and Health Statistics (2) Sp Lee

Analysis of routinely collected data on the health status and the care of populations, with emphasis on the potential and the limitations of this approach. Stressed are the importance of such data for the development and the evaluation of programs and the recognition of new hazards. Students acquire a firm grasp of the technical problems of vital data and make a personal interpretation of a problem. Offered jointly with the Department of Epidemiology and International Health as Epidemiology and International Health 478. Prerequisite, Health Services 472 or equivalent or permission.

# PC BS

497 Biostatistics Special Electives (\*) AWSp Off-campus course for medical students.

#### PC BS

498 Undergraduate Thesis (\*) AWSpS

#### PC BS

499 Undergraduate Research (\*) AWSpS

# **Courses for Graduates Only**

PC BS

511, 512, 513 Medical Blometry I, II, III

(3,3,3) A,W,Sp Feigl, Kanarek, Kronmal, Martin,

Thompson

Application of mathematical and statistical techniques to the problems of advanced medical and epidemiological research.

#### PC BS

# 562 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.

#### PC BS

# 571, 572, 573 Special Topics in Advanced Biostatistics (3, max. 6; 3, max. 6;

3, max. 6) A,W,Sp

Breslow, Fisher, Martin, Wahl

Covered are multivariate analysis, clinical trials, health-survey design and analysis, Bayesian decision procedures, regression and classification techniques, stochastic models in biology and medicine, and other advanced statistical methods.

#### PC BS

580 Seminar in Biostatistics (\*, max. 5) AWSp Feigl

Presentation and discussion of special topics and research results in biostatistics. Speakers include resident faculty, visiting scientists, and advanced graduate students. Required for students in the Department of Biostatistics training program.

#### PC BS

#### 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. Required of students in the biostatisticshealth services graduate training program. Offered jointly with the Department of Health Services as Health Services 582.

#### PC BS

# 583 Epidemiology and Biostatistics Research Seminar (1) AWSp

Fox, Thompson

Promotes critical reading of scientific papers and increases knowledge and understanding of principles and methods in epidemiology. Offered jointly with the Department of Epidemiology and International Health as Epidemiology and International Health 583.

#### PC BS

590 Biostatistical Consulting (3, max. 9)

# AWSp

Feigl, Kanarek, Wahl Training in consulting on the biostatistical aspect of research problems arising in the biomedical field. Students, initially under the close supervision of a faculty member, participate in discussions with investigators leading to the design and/or the analysis of a quantitive investigation of a problem. With experience, independent associations of student and research worker are encouraged, with subsequent review by faculty of resulting design and analysis. Required for students in biostatistics graduate program.

# **ENVIRONMENTAL HEALTH**

# Courses for Undergraduates

#### PC EH

411 Introduction to Environmental Health (3) W

Hatlen Relationship of man to his environment, how it affects his physical well-being and what he can do to influence the quality of the environment and to enhance the protection of his health. Emphasis on environmental factors involved in transmission of communicable diseases and hazards due to exposure to chemical and physical materials in our environment.

#### PC EH

# 440 Water and Waste Sanitation (4) A Van Dusen

Advanced study of the pollution factors, the sanitary control of water supplies, and sewage and refuse disposal, with emphasis on the knowledge and skills utilized by the sanitarian. Prerequisites, environmental health major and 411, or permission.

#### PC EH

#### 441 Food and Milk Sanitation (4) W Jackson

Advanced study of the sanitary control of the production, processing, and distribution of food, products, emphasizing control of foodborne diseases. Prerequisite, microbiology course or permission.

#### PC EH

#### 442 Vector Control and Solid Waste Sanitation (3) Sp

Hatlen

Advanced study of the impact and the control of rodents and arthropod vectors of disease; or programs and problems associated with solidwaste disposal and control. Prerequisites, 411 and environmental health major, or permission.

## PC EH

#### 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 sanitation 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.

#### PC EH

#### 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 with administrative and regulatory activities. Prerequisites, 411 and environmental health major, or permission.

#### PC EH

#### 449 Health Effects of Air Pollution (2) Frank

Structure and function of the respiratory and cardiac systems and the changes that may be produced by specific air pollutants, such as ozone, carbon monoxide,  $SO_2$ , etc. Air quality criteria and the economic costs of disease are discussed. Several classroom demonstrations. Prerequisites, sophomore standing, and 450, CEWA 461, or permission.

#### PC EH

#### 450 Measurement and Control of Air Pollution (2) A

Breysse

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.

# PUBLIC HEALTH AND COMMUNITY MEDICINE



#### 453 Industrial Hygiene and Safety (3) W Breysse

Review of occupational health and safety hazards, including causes, effects, evaluation, pre-vention, and legislation.

#### PC EH

#### 457 Noise and the Environment (2) Sp Brevsse

Examination of urban community noise problems, including sources, effects, and control, and legislation.

#### PC EH

Accident Prevention (2) A 460 Discher

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.

#### PC EH

#### 462 Laboratory Management and Safety (1) W Breysse

Designed for laboratory management safety, to consider chemical and physical hazards; their control and management.

#### PC EH

480 Environmental Health Problems (\*, max. 6) AWSpS

Van Dusen, Staff

Individual projects involving library, laboratory, or field study of a specific environmen-tal health problem. Prerequisite, environmental health major or permission.

# PC EH

#### 482 Field Practice-Technology (2-6). AWSpS

Van Dusen, Staff

Assignment to a local health department for supervised application of public health prac-tices and environmental control techniques. Prerequisites, environmental health major and permission.

# PC EH

483 Field Practice—Program Planning (6) AWSpS

Van Dusen, Staff

Assignment to a local health department for supervised observation and experience in environmental health program planning. Prerequisites, environmental health major and permission.

#### PC EH

#### 484 Field Practice—Community Resources (3) AWSpS

Van Dusen, Staff

Assignment to a local health department for training in the utilization of community resources. Prerequisites, environmental health major and permission.

#### PC EH

# 497 Environmental Health Special Electives (\*) AWSpS

Off-campus course for medical students.

#### PC EH

Undergraduate Research (\*) AWSpS 499 Van Dusen, Staff

Individual research on a specific topic in envi-ronmental health upon which specific conclu-sions, judgments, or evaluation can be made or facts can be presented. Prerequisites, environmental health major or permission.

#### **Courses for Graduates Only**

#### PC EH

#### 511 Environmental Health (3) A Milner

General survey of all physical environmental factors affecting human health and functioning, including general community, special occupational, and exotic environments. Considered are effects of heat, cold, light, circadian rhythms, ionizing and nonionizing radiation, air pollution, water resources, pesticides, food additives, solid-waste disposal, accidents, hyperbaric environments, and specific industrial hazards. Prerequisite, M.D., Ph.D., medical student, or permission.

#### PC EH

#### 521 Environmental Components (3) A Hatlen

Examination of the physical components that influence man's health and his efficiency of performance. Major components are defined, then examined individually and in concert with the total environment. Interrelationships of the physical environment and social, cultural, and economic influences are considered. Prerequisite, environmental health graduate student or permission.

#### PC EH

522 Environmental Programs (3) W Fish

Environmental programs are examined with regard to determination of needs, establishment of controls, and the legal and organizational framework within which they exist. The operational aspects of programs are explored, considering organization, planning, staffing, financ-ing, and evaluation. Agencies are visited and studied, and a report is presented. Prerequi-sites, 521, environmental health graduate student, or permission.

#### PC EH

#### 523 Environmental Management (3) Sp Hatlen, Reed

Examination and discussion of human resources as a critical component in environmental programs: Emphasis on the importance of interaction, communication, and involve-ment in the achievement of environmental control goals and on the maximizing of human resources through the application of progressive principles in the recruitment, training, and utilization of personnel in environmental control programs. Prerequisites, 521, 522, environmental health graduate student, or permission.

#### PC EH

# 553 Industrial Hygiene Instrument Laboratory (2) W Breysse, Hibbard

Laboratory focuses on theory and practical use of various sampling instruments utilized to evaluate potential industrial hazards. Prerequisite, 453 or permission.

#### PC EH

#### 555 Industrial Hygiene Chemistry Laboratory (2) Sp

Brevsse Laboratory focuses on theory and practical use of various chemical analytical instruments utilized to evaluate potential industrial hazards. Prerequisite, 453 or permission.

#### PC EH

557 Control of the Industrial Environment (3) Sp

Breysse, Hibbard

Principles of control of the industrial environment, including noise and hazardous chemicals,

with special emphasis on design of exhaustventilation systems. Prerequisite, 453 or permission.

#### PC EH

# 571 Occupational Physiology and Toxicology (3) W

Discher, 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, Chemistry 232, Zoology 208, or permission.

#### PC EH

# 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 the Department of Epidemiology and In-ternational Health as Epidemiology and International Health 572. Prerequisite, 200-level biology course or medical student standing with Human Biology 430 or permission.

#### PC EH

#### **Medical Management of Environmental** 573 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.

#### PC EH

# 580 Environmental Seminar (1, max. 6)

AWSpS Kaplan, McJilton

Current environmental health research and environmental control programs.

#### PC EH

#### 581 Environmental Reading (1, max, 6) AWSpS

Critical reading of selected basic and applied research publications on environmental health problems and programs.

#### PC EH

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 Health Services 590 and Epidemiology and International Health 590. For more information and permission, consult department program adviser.

#### PC EH

599 Field Studies (2-6, max. 6) AWSpS Assignment to an environmental research or service program for application of evaluating techniques.

# EPIDEMIOLOGY AND INTERNATIONAL HEALTH

#### PC EP

410 Principles of Communicable Disease **Control and Biostatistics (2) AWSp** Vital statistics, measures of central tendency and dispersion, introduction to interpreting sta-

tistical data, and control of communicable dis-

534



ease. Required of senior nursing students in the basic nursing curriculum. Offered jointly with the Department of Biostatistics as Biostatistics 410. Prerequisite, Health Services 323.

#### PC EP

#### 420 Principles of Epidemiology (3) A Hall, Staff

Descriptive, analytic, and experimental epidemiology, as presented in examples from infectious and chronic noninfectious disease. Includes descriptive statistics as applicable in epidemiology. Prerequisite, Health Services 323, Microbiology 301 or permission, or graduate standing.

#### PC EP

#### Application of Vital and Health Statistics (2) Sp 478

Lee, Weiss

Analysis of routinely collected data on the health status and the care of populations, with emphasis on the potential and the limitations of this approach. Stressed are the importance of such data for the development and the evaluation of programs and the recognition of new hazards. Offered jointly with the Department of Biostatistics as Biostatistics 478. Prerequisite, Biostatistics 472 or equivalent or permission. ۰.

# PC EP

#### 497 Epidemiology and International Health Special Electives (\*) AWSpS

Off-campus course for medical students. Prerequisite, permission.

#### PC EP

499 Undergraduate Research (\*) AWSpS Prerequisite, permission.

# **Courses for Graduates Only**

#### PC EP

510 Applications of Epidemiology (4) Sp Gale

Introduction of epidemiologic principles and examples of the application of these principles to the monitoring of disease occurrence, epidemiologic investigation, disease control, and health program evaluation. Examples from acute and chronic diseases, environmental health, and health care delivery are used. Recommended for graduate students whose primary interests lie in areas other than epidemiology. Prerequisites, graduate standing and permission.

#### PC EP

#### 511 Principles of Epidemiology (3) A Fox

Lectures and discussions covering evolution and meaning of epidemiology, concepts of disease causation, basic epidemiologic methods, and descriptive, analytic, and experimental epidemiology. A term paper on the epidemiology of a selected disease is required. Prerequisite, permission.

#### PC EP

#### 512 Epidemiology of Chronic Diseases (3) W Lee, Weiss

Study of the principles and practices of epidemiology as applied to the noncommunicable diseases. Prerequisite, 511 or permission.

# PC EP

#### 513 Epidemiology of Acute Diseases (3) Sp Älexander

Study of the principles and the practices of epidemiology, as derived from a study of communicable diseases. Prerequisite, 511 or permission.

#### PC EP

#### 521 Epidemiology of Perinatal Problems, (3) Sp

Emanuel

Consideration of the contribution of epidemiology to the understanding of the etiology of various perinatal problems, including congenital malformations, fetal, infant, and maternal mortality, abortion, neonatal morbidity, complications of pregnancy, prematurity, and mental retardation, together with the evaluation of control problems. Prerequisites, graduate, medical, or dental school standing and 510 or 511, or permission.

#### PC EP

#### 531 Problems in International Health (3) W Emanuel

Survey of the relationships of the sociocultural, political, economic, and demographic characteristics of developing countries to disease occurrence and to the solution of health problems. Prerequisite, graduate or medical student or permission.

#### PC EP

#### 540 Anthropology and Health (3) Kunstadter

Seminar on the history, development, and future of anthropological contributions to problems of health and illness. Offered jointly with the Department of Anthropology as ANTH 540. Prerequisite, permission.

#### PC EP

572 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 the Department of Environmental Health as Environmental Health 572. Prerequisite, 511 or permission.

#### PC EP

# 583 Epidemiology and Biostatistics Research Seminar (1) AWSp

Fox, Thompson

Promotes critical reading of scientific papers and increases knowledge and understanding of principles and methods in epidemiology. Offered jointly with the Department of Biostatistics as Biostatistics 583.

#### PC EP

#### 590 Selected Topics in Epidemiology or International Health (2-6, max. 6) AWSpS

Tutorials are arranged for a small number of students for in-depth examination of an area of epidemiology or international health, usually of current nature. Seminar format. Prerequisite, 511. Also a special summer format presenting introductory material. May be taken with Environmental Health 590 and/or Health Services 590. For more information and permission, consult the department program adviser.

#### PC EP

#### 598 Teaching Methods in Epidemiology and/or Preventive Medicine (1-3) AWSp Foy

Supervised teaching experience in public health and in epidemiology. Student formulates an outline for a course in epidemiology or related subject. He makes one or more formal presentations to class and is encouraged to use modern educational methods and teaching media. He constructs test questions on lecture subjects. Prerequisite, EDPSY 449 or equivalent.

#### PC EP

#### 599 Practice of Epidemiology (\*) AWSp Peterson

Participation in the field investigations of acute or chronic disease occurrence. Prerequisite, permission.

# PC EP

#### 600 Independent Study or Research (\*) AWSpS

Prerequisite, permission.

#### PC EP

700 Master's Thesis (\*) AWSpS Prerequisite, permission.

# PC EP

800 Doctoral Dissertation (\*) AWSpS Prerequisite, permission.

# **HEALTH SERVICES**

#### PC HS

- 323 Introduction to Public Health Principles and Practices (3) AWSpS Wilkey

Survey of principles, practices, and agencies concerned.

#### PC HS

424 Public Health Programs (3) Sp.

Hall

Current problems and programs of major con-cern in health care delivery, mental health, chronic diseases, and medical economics.

#### PC HS

497 Health Services Special Electives (\*) AWSpS

Off-campus course for medical students.

#### PC HS

498 Undergraduate Thesis (\*) AWSpS

# PC HS

499 Undergraduate Research (\*) AWSpS

#### **Courses for Graduates Only**

#### PC HS

505 Health Policy and Medical Care (2) Sp Bergman

Interdisciplinary seminar designed to survey factors affecting health policy and programs. The subject is viewed by representatives of medicine, sociology, economics, political science, and others. Offered jointly with the Graduate School of Public Affairs as Public Policy 505. Prerequisite, permission.

#### PC HS

#### 511 Health Services and Medical Care (4) W Dav

Intensive introduction to the subject, including measurement of need and demand, the resources for health care, private and public efforts to provide health services, elements of medical care, program planning and evaluation, the biological basis of organized public health activities, public health programming, health behavior and its modification, social science applications in health services and medical care, and related topics. Prerequisite, graduate standing or permission.

#### PC HS

#### Medical Care (3) Sp 512 Richardson

Intensive treatment of aspects of medical care, including access, quality, financing and supply, institutional and provider arrangements, private and public programs to supply care, and related issues. Prerequisite, 511 or equivalent, or permission.

## PC HS

513 Health Planning: Implementation and Goals (3) Å

Riackman

Study and discussion of the methods of comprehensive 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.

#### PC HS

# 514 Program Evaluation (3) W

Richardson

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. Students are expected to gain familiarity with the basic principles of experimental design and the variations necessitated by their application in practical settings. Case studies are used to illustrate the various types of evaluation. Offered jointly with the Graduate School of Public Affairs as Public Policy 514. Prerequisites, adequate background in quantitative methods (e.g., Biostatistics 512 or 513) and permission.

#### PC HS

519 Health Services Seminar (\*, max. 4) A Presentations predominantly by students, pri-

marily health services majors, emphasizing detailed examination of aspects of medical care, medical administration, public health pro-grams, and allied topics. Prerequisites, 511, 512, and 513 or concurrent registration, and permission.

#### PC HS

521 Community Health Education (3) A Basic concepts related to community health education with emphasis on the psychosocial and cultural factors related to health and health education practice. Emphasis is on the determinants of health behavior at the individual, group, and community levels, and on the role of health education as an instrument of planned change. Prerequisite, health education concentration or permission.

#### PC HS

#### **Community Organization for Health (4)** 522

Anderson

Emphasis on the diagnosis of community health problems and various organizational practices utilized for effective solution. Review and analysis of the community organization process; resources; role of the community health workers, relationship to the practice of community health education. One-half day of field work required. Prerequisites, health education concentration and permission.

#### PC HS

#### 530 Community Medicine (3) AW Browder, Gilson

One-half day field and two hours seminar experiences weekly in community agencies delivering and planning health services. Visits may be made to neighborhood clinics, comprehensive health planning bodies, group medical

public health agencies, special practices, problem (drug, alcohol, sexuality) clinics. mental health facilities, environmental services, and others. Related subjects are discussed in weekly seminars by students, faculty, and guests. Prerequisite, medical student standing; others by permission.

# PC HS

# 531 Independent Field Studies in Community Medicine (2-15) AWSpS

Gilson

In-depth experience in variable time blocks in one or more community health activities in agencies delivering and planning health services: Sites may include neighborhood clinics, comprehensive health planning bodies, medical practice settings, public health agencies, special problem clinics and facilities, environmental programs and services. Prerequisite, medical student or permission.

#### PC HS

#### 546 Economic Studies of Health Care (3) Lagace

Examination of topics related to the economics of health care, including supply and demand factors, financing of care, efficiency and cost of delivery, and allied areas. Offered jointly with the Department of Economics as Economics 546. Prerequisite, graduate standing in the School of Public Health and Community Medicine; others by permission.

### PC HS

#### 551 Health Services Management I (3) A Dowling

The first of a three-course sequence dealing with the management of health institutions and programs, with special emphasis on the general hospital. Included are a review of hospital ownership, organization, and control; health services law, manpower management; and positive and special professional elements of patient care. Prerequisites, 511, 512, and permission.

#### PC HS

552 Health Services Management II (3) W Dowling

Second course in a three-course sequence dealing with the management of health services institution and programs. Topics covered include: health facilities logistics, financial management, and application of quantitative methods in health services administration. Prerequisite, 551.

#### PC HS

#### 553 Health Services Management III (3) Sp Lagace, Seifert

Third course in a three-course sequence dealing with the management of health services institutions and programs. Topics covered are: health services law, hospital and program policy decisions, financial planning, and hos-pital design and architecture; and the presentation of hospital survey and health services research project reports. Prerequisites, 551 and permission.

# PC HS 561 Seminar on Sociological Aspects of

Shortell

Critical examination and discussion of sociological approaches-methodological, theoreti-cal, and empirical-in the health care field. Particular attention is paid to applied studies in the field and, more broadly, to the implications for decision making from the sociological perspective. Prerequisite, 511 or undergraduate major in sociology or permission.

#### PC HS

#### 567. Politics of Health Care (3) Sp Jackson

Provides analytical skills for viewing health care delivery within the context of the American political system. Distinctive characteristics of the health field are examined as these relate to the formulation and implementation of health policy, as well as the areas, that health shares in common with other policy areas. Emphasis in the course is on the political processes underlying the ever-expanding role of government in health care. Prerequisite, 511 or permission.

#### PC HŚ

580 Health Services Research Seminar (1) W Presentations of current research programs of faculty, students, and selected guest investigators. Topics include quality evaluation, mea-surement of health benefits, program design and evaluation, and related issues. Prerequisite, graduate standing in the School of Public Health and Community Medicine; others by permission.

#### PC HS

581 Health Services Reading Seminar (1) Sp Review of current literature in health services. introduced topically, covering major areas of health policy, health services research, medical care and public health programs, and related areas. Prerequisite, graduate standing in the School of Public Health and Community Medicine; others by permission.

#### PC HS

#### 582 Seminar in Biostatistics Applied to Health Services Research (1, max. 5) AWSp8

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. Re-quired of students in the biostatistics-health services graduate training program. Offered jointly with the Department of Biostatistics as Biostatistics 582. Prerequisite, permission.

#### PC HS

#### 590 Selected Topics in Health Services (\*) 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 Environmental Health 590 and/or Epidemiology and International Health 590. For more information and permission, consult depart-ment program adviser.

#### PC HS

# 595, 596, 597 Field Analysis Project/Research Project (3,3,3) A,W,Sp

Blackman, Dowling, Lagace, Seifert

Supervised research in a selected topic related to student's concentration in graduate study. Includes survey of literature, development of approach, and written paper on conclusions. Prerequisite, successful completion of firstyear curriculum and internship in graduate program in health services administration and planning.

# PC HS

Field Practice in Public Health (\*) 599 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 studeht interest and educational needs. Prerequi-site, graduate standing in the School of Public Health and Community Medicine; others by permission.

# CONJ

462 Preventive Medicine in Primary Care (2) (See Conjoint Courses.)

# PATHOBIOLOGY

#### PC PR

# 451 Laboratory Diagnosis of Viral Infections (4) Sp

Cooney

Lecture and laboratory covering diagnostic procedures for etiologic diagnosis of viral in-fections: 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, Microbiology 441, 442, or equivalent.

# PC PB

#### Pathobiology Special Electives (\*) 497 AWSpS

Off-campus course for medical students.

#### PC PB

499 Undergraduate Research (\*) AWSpS

### **Courses for Graduates Only**

#### PC PB

521 Mammalian Cell Culture as a Tool for Virus Research (\*, max. 3) A Kennv

General concepts and techniques of cell culture, as applied to problems of virus isolation and propagation. Prerequisite, permission.

## PC PB

# 522 Antigenic Analysis of Micro-organisms (\*, max. 3) W

Kennv

Theory and techniques for antigenic analysis of micro-organisms (bacteria, mycoplasmata, and viruses). Prerequisite, permission.

### PC PB

# 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, mycoplasmata, and bacterial and animal viruses. Instruction is given in operating the electron microscope, in the examination of specimens, and in producing photographic data. Prerequisite, permission.

#### PC PB

Cell Surface Membrane in Cell 525 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 cov-ered. Prerequisites, Biochemistry 440, 441, 442 and Microbiology 447, and permission. Offered jointly with the Department of Microbiology as Microbiology 525.

#### PC PB

580 Pathobiology Seminar (1, max. 9) AWSpS Research reports from both students and faculties are presented and discussed. Topics include immunochemistry, viruses, membranes, infectious diseases, immune response. Prerequisite, permission.

#### PC PB

#### 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 microorganisms and viruses. Prerequisite, graduate student standing in pathobiology; others by permission.

#### PC PB

# 582 Seminar on Molecular Biology of Animal Viruses (1, max. 12) AW Wise

In-depth study of one or more animal virus types of current interest. Topics include cellvirus interactions, control of viral replication and protein synthesis, assembly of mature virus, relationship between structure and antigenicity, and recombination and genetic analysis in DNA and RNA viruses. Direct participation of students in the presentation of topics is required. Prerequisite, permission.

PC PB

#### 598 Didactic Pathobiology (\*, max. 12) 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.

# PUBLIC HEALTH AND **COMMUNITY MEDICINE**

PC

#### 600 Independent Study or Research (\*)

PC 700 Master's Thesis (\*)

# **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 classoom hour and one hour of corps training per week.

#### 211, 212, 213 Aerospace Studies 200 (1.1.1) A,W,Sp

Introduction to the study of air power. The course is developed from an 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.

AS

#### 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.

AS

#### 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. One hour of leadership laboratory per week is required during the year. 3 quarter credits of academic enrichment subjects must be completed during the year, preferably in the areas of written or oral communication.

#### M SCI

#### 201, 202, 203 Military Science II: Basic (3,2,1) AWSp,AWSp,AWSp

Principles of the art of warfare as they are exemplified in American military history; tacti-

RESERVE OFFICER TRAINING PROGRAMS

# RESERVE OFFICER TRAINING PROGRAMS

cal lessons and leadership techniques demonstrated in the most significant American campaigns and engagements; fundamentals of military map reading, aerial photography interpretation and field navigation with map and compass; 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. One hour of leadership taboratory per week and one weekend field exercise are required during the 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 fac-tors 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. Three classroom hours and one hour of leadership laboratory per week, two weekend field exercises, and 3 quarter credits of academic enrichment subjects are required during the year. A tax-free stipend of \$100 per month is paid to contract students enrolled in the advanced program.

#### M SCI

# 304 Military Science III: Advanced (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. Concurrent with 301.

#### M SCI

# 401, 402, 403 Military Science IV: Advanced (2,3,2) AWSp,AW,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 smallunit leader, with emphasis on coordination and detailed planning by the junior officer; analysis and discussion of the process of planning suc-cessful military operations. Two classroom hours and one hour of leadership laboratory per week are required in 401 and 403. During Autumn Quarter and Winter Quarter, a course in military law is offered by the Division of General and Interdisciplinary Studies (General and Interdisciplinary Studies 448) for all advanced course cadets. This course replaces 002 house for a base of loadership lober 402; however, one hour of leadership labora-

tory per week is still required. 6 quarter credits of academic enrichment subjects are required during the year. A tax-free stipend of \$100 per month is paid to contract students enrolled in the advanced program.

# NAVAL SCIENCE

# **Courses for Undergraduates**

#### N SCI

#### 111 The Naval Service (3) A

General introduction to the Navy, its 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 "day'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, Mathemat-ics 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 midshipmen to the management process and the relationship of management functions to leadership. Acceptance of a traditional deep sense of moral responsi-bility 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 Field of Social Welfare (5) AWSp Berleman, Brink, Dear, Duplica, Meld, Parsons

Origin, development, and present status of social service programs, with particular emphasis on the relationship of program resources, human needs, and the methods through which services are provided. Prerequisite, upperdivision standing.

#### SOC W

#### 310-311-312 Social Welfare Practice (2-2-2) A,W,Sp Berleman, Whittaker

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

#### 390 Introduction to Social Welfare Research (3) AWSp

Gottlieb, Hutchins

Introduction to the logic of the scientific method as applied to research in social work/ social welfare; a beginning understanding of the interrelated steps in the conduct of a research study; and development of skills in the critical consumption of social welfare research and the relationship of this research to social welfare practice. Open to social welfare majors; others by permission.

#### SOC W

#### 401 Interviewing and Counseling Skills (3) Sp Macdonald

Ten sessions focused on experiential learning of skills in interviewing and counseling persons with problems in their social functioning. Focus also on identifying and practicing skills in communications, including listening, observing, interviewing, discussing, confronting, and reviewing.

#### SOC W

#### 409 Readings in Social Welfare (1-4, max. 12) AWSp

Prerequisite, permission.

#### SOC W

#### 410-Beginning Social Work Practice (2-) A Duplica, Resnick, Whittaker

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-.

#### SOCW

# -411- Beginning Social Work Practice (-2-) W Duplica, Ochoa, Teather, Whittaker

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

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-412 Beginning Social Work Practice (-2) Sp Bryant, Duplica, Ochoa

Elaboration of concepts and methods developed in 410- and -411- Prerequisites, 410-411and 415-416-. To be taken concurrently with -417. \

# /SOC W

415- Beginning Field Instruction (3-) A Students are placed in selected social service agencies and accept beginning social service assignments under the supervision of competent agency personnel. Prerequisites, social welfare major, and 300. To be taken concurrently with 410-. Offered on credit/no credit basis only.

#### SOC W

# -416- Beginning Field Instruction (-3-) W

Continuation of student placements in assigned social service agencies. Students assume increasing responsibility for particular service as-signments. Prerequisites, 410- and 415-. To be taken concurrently with -411-. Offered on credit/no credit basis only.

# SOC W -417 Beginning Field Instruction (-3) Sp

Continuation of student placements in social service agencies. Students complete service assignments and work through termination process. Prerequisites, 410-411- and 415-416-. To be taken concurrently with -412. Offered on credit/no credit basis only.

Note: Social Work 410-411-412 and 415-416-417 must be taken during the student's senior year. The sequences must be completed in order for the student to receive credit for any one of the courses.

#### SOC W

420 Social Gerontology (4) Beatty

Generational component in social work practice. Discussion of value differences across 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 implement-ing social change on behalf of the aged. Prerequisite, upper-division standing.

#### SOC W Methods of Child Care and Treatment (3) 421

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

#### **Physical Structure and Human Interaction** 447 (2) W

Resnick, Sasanoff

For social work and architectural students. Examines the effect of physical structure on human interaction. Offered jointly with the College of Architecture and Urban Planning as Architecture 447. Prerequisite, permission.

#### SOC W

#### 470 Crisis Intervention in Social Welfare (3) 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 (2) Bentz, Chambliss, Shisoka, Krisologo,

Northwood, Ochoa

Examination of selected social welfare problems as related to specific ethnic and racial minority groups. Attention is given to understanding of minority populations and the effective delivery of social work and social welfare services in those communities. May be repeated for credit.

# SOC W

# 502 Social Welfare Policy (2)

Brink, Dear, Duplica, Lewin, Parsons Introduction to major institutions responsible for implementing social welfare programs. Analysis and examination of the processes through which social welfare policies are developed; the interactive relationships of social welfare policies among various programs; and emerging issues and new policy developments in the field.

# SOC W

#### 504 Social Problems and Social Welfare (3, max. 9)

Beatty, Bracht, Dear, Herrick, Roffman Analysis of major social problems and social welfare service systems providing a systematic approach to assessing the scope, causes, social cost, and public policy alternatives in the provision of services related to such problems, selected social problems such as poverty and ill health, juvenile delinquency, drug and alco-hol 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 (Social Work 560) concerned with ameliorating or alleviating the social problem under study.

# SOC W -

# 507 Seminar (2) AWSp

Bryant, Duplica, Roffman May be repeated for credit. Prerequisite, permission.

#### SOC W

509 Readings in Social Work (\*) AWSpS May be repeated for credit. Prerequisite, permission.
# SOCIAL WORK

#### SOC W

#### 510 Social and Behavioral Foundations of Social Work Practice (5)

Introduction to selected theoretical orientations upon which various current modalities of social work practice are based. The implications of each of these orientations for work with large and small client systems are, discussed. The course consists of selfcontained units of study.

#### SOC W

#### 515 Field Instruction (2-8) AWSp

Social work majors only. Prerequisite, permission.

# SOC W

- 529 Introduction to Human Services Practice (2, max. 12)
  - Farber, Hanneman, Hutchins, Ishisaka, R. Macdonald, Maier, F. Miller, S. Miller, Mundt, Norton, Resnick, Richey, Teather, Whittaker

Topics covering various helping methods used in practice with individuals, families, and small groups. (Formerly 511.)

#### SOC W

533 Advanced Human Services Practice (2) Advanced human services practice in special Areas. Intensive study of practice materials with emphasis upon development of appropriate interventive and methodological skills. May be repeated for credit.

#### SOC W

535 Advanced Field Instruction (2-10, max. 20) AWSp

Prerequisite, 515.

#### SOC W

540 Human Behavior and Social Environment (3)

Farber

Overview of the developmental continuum. Exploration of biological, psychological, and sociocultural factors in the life cycle and their effects on the development of personality.

#### SOC W

541 Special Topics in Human Development (3, max. 9)

Allen, Anderson, Beatty, Farber,

Ishisaka, R. Macdonald, Maier, Mundt, Richey, Teather

Specific aspects of biopsychosociocultural development,

#### SOC W

#### 560 Basic COD Interventive Skills (2) WSp Bracht, Bryant, Meld, Resnick

Methodologically based course providing for the acquisition of professional analytic and interventive skills associated with social work practice in community organization, planning, administration, and policy analysis. Content draws upon research from social work and related social science disciplines. May be repeated for credit. Prerequisite for COD students, concurrent registration in 569.

#### SOC W

# 569 Social Work Practice Skills Laboratory (1)

Gottlieb

Laboratory component of practice and skill courses to assist students in applying skills to specific tasks or practice experiences. Instructors provide existing or simulated opportunities for achievement of more specific behavioral (skill) objectives. May be repeated for credit.

#### SOC W

570 Specialized COD Interventive Skills (2) Methodologically based course related to specialized aspects of COD practice. Includes such areas as grant writing, budget preparation, and interdisciplinary methods. May be repeated for credit. (Formerly 534.)

#### SOC W

575 Special Topics in Social Welfare Policy (2, max. 6)

Anderson, Dear, Duplica, Farber, Gottlieb, Gronewold, Herrick, Meld, Patti, Roffman

Analyzes new or expanding areas of social welfare policies and services. Emphasis on developing the student's knowledge of, and ability to assess, social welfare programs. The role of social work is examined in these expanding legislative and program directions. (Formerly 505.)

#### SOC W

585 Systematic Theory Building (2) ' Northwood

Study of research methodology as used in the construction of theory relevant to social work practice. Focus is on selected problems requiring theory production, as related to individual theses and to the assessment of research studies and policy papers.

#### SOC W

586 Statistics in Social Work (2) Solem

#### SOC W

#### 588 Research in Community and Organizational Settings (2) Jaffee

Study of selective research methods and techniques useful in measuring organizational performance, evaluating program effectiveness, and determining community need and demand for various types of social welfare services. May be repeated for credit.

# SOC W

#### 590 Social Welfare Research (2)

Beatty, Griswold, Herrick, Hutchins, Jaffee, Northwood, Streshinsky

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, so-cial welfare research.

#### SOC W

#### 591 Individual or Group Research Project (2, max. 6) AWSp

Field practice in a group or individual project in lieu of a master's thesis (except for students in the special program). Includes development of research design, collection of data, tabulation and analysis, and report writing. Prerequisite, 590 or equivalent.

## SOC W

#### 594-595 Advanced Social Work Research (2-2) Gottlieb, Griswold, Herrick, Hutchins, Jaffee, Northwood, Streshinsky

Study of the logic and principles underlying the collection and analysis of data and the presentation of findings in social research. Evaluation of published reports of empirical research with emphasis on relevance of such research to social work practice.

SOC W

#### 600 Independent Study or Research (\*)

SOC W 700 Master's Thesis (\*) AWSp

/// Master's Thesis (') Awsp



# FACULTY INDEX

The first date following a name indicates the beginning of service at the University. When two dates are given, the second, in parentheses, is the date of promotion to present academic rank. Members of the Graduate School faculty are designated by an asterisk.

All appointments shown are as of Autumn Quarter 1973.

Å

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, GEORDÍS M., 1960 (1965), Assistant Professor of Anesthesiology; Chief of Anesthesiology, Veterans Administration Hospital; B.S., 1953, Saskatchewan; M.D., 1955, Toronto

AAVEDAL, MYRNA J., 1971, Instructor in Family and Community Nursing; Diploma, 1963, Carroll; B.S., 1966, Montana State; M.A., 1971, Washington

ABBS, JAMES H.,\* 1970, Assistant Professor of Speech; B.S., 1967, Wisconsin State; M.S., 1968, Ph.D., 1970, Wisconsin

ABERNATHY, RUTH, 1967, Professor Emeritus of Physical and Health Education; A.B., 1929, Oklahoma; M.A., 1931, Ph.D., 1943, Columbia ABRAMS, ROBERT EDWARD, 1971 (1973), Assistant Professor of English; B.A., 1965, Dartmouth; Ph.D., 1973, Indiana

ACHUTARAMAYYA, GADDIPATI, 1972, Research Associate in Ceramic Engineering; B.Sc. (Hon.), 1960, M.Sc., 1961, Andhra, India; M.S., 1967, Ph.D., 1972, Washington

ACKER, WILLIAM C., 1970, Lecturer in Electrical Engineering; Senior Engineer, Applied Physics Laboratory; B.S., 1957, M.S.E.E., 1963, 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 (1972), Associate Professor of Physics; B.S., 1960, Ph.D., 1967, California Institute of Technology

ADMAN, ELINOR T., 1971 (1973), Research Associate in Biological Structure; B.S., 1962, Wooster; M.A., 1964, Ph.D., 1967, Brandeis

ADOLPHSON, DONALD L., 1970, Assistant Professor of Quantitative Methods; B.A., 1966, California (Berkeley); M.S., 1968, Ph.D., 1973, Wisconsin

AESCHLIMAN, DOROTHY D., 1973, Instructor in Comparative Nursing Care Systems; Diploma, 1949, B.S., 1949, Rochester; M.N., 1966, Washington

AFFLECK, JAMES Q.,\* 1967 (1970), Associate 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

AHLERS, ELEANOR E.,\* 1966 (1970), Professor of Librarianship; A.B., 1932, Washington; B.L.S., 1942, Denver; M.A., 1957, Washington

AHLSTROM, HARLOW G.,\* 1962 (1971), Professor of Aeronautics and Astronautics; on leave; B.S. in A.E., 1957, M.S. in A.E., 1959, Washington; Ph.D., 1963, California Institute of Technology

AKAGANE, KATSUO, 1972, Research Associate in Forest Resources; B.S., 1964, Konan; M.S., 1969, Ph.D., 1972, 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. in C.E., 1956, Washington; M.S. in C.E., 1960, Massachusetts Institute of Technology

ALBRECHT, ROBERT WILLIAM,\* 1961 (1971), Professor of Nuclear Engineering; B.S. in E.E., 1957, Purdue; M.S. in N.E., 1958, Ph.D., 1961, Michigan

ALDEN, DAURIL,\* 1959 (1969), Professor of History and Latin American Studies; Chairman of Latin American Studies; A.B., 1950, M.A., 1952, Ph.D., 1959, California (Berkeley)

ALDEN, RICHARD,\* 1961 (1969), Associate Professor of Architecture; B.A., 1957, Washington; M.S., 1960, Yale; Ph.D., 1971, Pennsylvania 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 and Chairman 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., 1973, Research Associate in *Esychosocial Nursing*; B.S., 1969, South Dakota State; M.N., 1971, Washington

ALEXANDRO, FRANK J.,\* 1964 (1968), Associate Professor of Electrical Engineering; B.E.E., 1956, M.E.E., 1959, Eng.Sc.D., 1964, New York

ALGEO, JAMES, 1967 (1969), Assistant Professor of Romance Languages and Literature and Latin American Studies; B.A., 1961, Sacramento State; M.A., 1963, Ph.D., 1969, Wisconsin

ALKIRE, DURWOOD L., 1973, Lecturer in Accounting; B.A., 1935, Washington; C.P.A., 1939, State of Washington

ALLAN, BARBARA J., 1971, Research Associate in Surgery; B.S., 1949, M.S., 1957, Washington

ALLAN, G. GRAHAM,\* 1966 (1973), Professor of Fiber and Polymer Science; Diploma, 1951, Associate, 1952, Strathclyde; B.Sc., 1952, Ph.D., 1956, Glasgow; D.Sc., 1970, Strathclyde

ALLARD, FRANCIS X.,\* 1968, Assistant Professor of Germanic Languages and Literature; A.B., 1964, Massachusetts; M.A., 1966, Ph.D., 1969, Stanford

ALLEN, ALLETHIA LEE, 1966, Assistant Professor; Assistant Director Practicum Instruction; B.A., 1947, M.S.W., 1950, Boston

ALLEN, CAROLYN RAND JOHNSON, 1972, Assistant Professor of English; B.A., 1965, Washington; M.A., 1966, Claremont Graduate School; Ph.D., 1972, Minnesota

ALLEN, DAVID R., 1971 (1972), Instructor in Radiology; B.S., 1967, Kansas; Ph.D., 1971, Washington

ALLENDOERFER, CARL BARNETT,\* 1951, Professor of Mathematics; B.S., 1932, Haverford; B.A., 1934, M.A., 1939, Oxford; Ph.D., 1937, Princeton

ALONZO, MANUEL LOUIS, 1972, Lecturer in Education; Director, Chicano Studies; B.A., 1957, Long Beach State; M.S., 1969, Sacramento State

ALPS, GLEN,\* 1945 (1962), Professor of Art; B.A., 1940, Colorado State College of Education; M.F.A., 1947, Washington

ALVAREZ, HERNAN III, 1968 (1973), Instructor in Medicine; M.D., 1968, Michigan

ALVORD, ELLSWORTH C., JR.,\* 1960 (1962), Professor of Pathology; B.S., 1944, Haverford; M.D., 1946, Cornell

AMANO, MINORU, 1972, Visiting Assistant Professor of Biological Structure; B.Sc., 1950, M.Sc., 1953, Hiroshima; Ph.D., 1961, McGill

AMES, WILLIAM E.,\* 1957 (1970), Professor of Communications; B.S., 1948, South Dakota State; M.S., 1952, Iowa State; Ph.D., 1962, Minnesota

AMMERLAHN, HELLMUT H.,\* 1968 (1972), Associate Professor of Germanic Languages and Literature; Abitur, 1957, Königstein; M.A., 1960, Vermont; Ph.D., 1965, Texas

AMMONS, WILLIAM F.,\* 1970, Assistant Professor and Chairman of Periodontics; B.A., 1955, Texas Christian; D.D.S., 1959, Texas; M.S.D., 1970, Washington AMORY, DAVID W., 1971, Assistant Professor of Anesthesiology and Pharmacology; B.S., 1952, M.S., 1955, St. John's University (New York); Ph.D., 1961, Washington; M.D., 1967, British Columbia

AMOSS, HAROLD L.,\* 1965 (1968), Professor of Urban Planning; Adjunct Professor of Anthropology; Director, Division of Community Development; B.A., 1942, North Carolina; M.A., 1947, New Mexico; Ph.D., 1951, California (Berkeley)

AMOSS, PAMELA T., 1972 (1973), Assistant Professor of Anthropology; B.A., 1953, M.A., 1961, Ph.D., 1971, Washington

ANDERSEN, JONNY,\* 1967 (1970), Associate Professor of Electrical Engineering; B.S. in E.E., 1960, Colorado; M.S., in E.E., 1962, Ph.D., 1965, Massachusetts Institute of Technology

ANDERSEN, NIELS H.,\* 1968 (1972), Associate Professor of Chemistry; B.A., 1963, Minnesota; Ph.D., 1967, Northwestern

ANDERSEN, WILLIAM R.,\* 1964 (1967), Pro-, fessor of Law; B.S.L., 1954, LL.B., 1956, Denver; LL.M., 1958, Yale

ANDERSON, ARTHUR G., JR.,\* 1946 (1957), Professor of Chemistry; A.B., 1940, Illinois; M.S., 1942, Ph.D., 1944, Michigan

ANDERSON, DONALD L.,\* 1947 (1964), Professor of Mining Engineering; Head, Division of Mining Engineering; B.S., 1938, St. Francis Xavier; B.Sc. in Min.E., 1941, Illinois

ANDERSON, FARRIS,\* 1967 (1973), Associate Professor of Spanish Language and Literature; B.A., 1960, M.A., 1962, Duke; Ph.D., 1968, Wisconsin

ANDERSON, FREDERICK N.,\* 1945 (1968), Professor of Art; B.A., 1944, Washington; M.F.A., 1954, Minnesota

ANDERSON, GEORGE C., 1958 (1970), Research Professor of Oceanography; B.A., 1947, M.A., 1949, British Columbia; Ph.D., 1954, Washington

ANDERSON, JAY W., 1956 (1961), Assistant Professor of Mechanical Engineering; B.S. in M.E., 1955, M.S. in M.E., 1961, Washington

ANDERSON, MARC W., 1970 (1971), Instructor in Community Dentistry; Chief, Hospital Dentistry; B.A., 1965, Augustana; D.D.S., 1969, Illinois; Certificate, 1970, Washington

ANDERSON, MARJORIE E.,\* 1971, Assistant Professor of Rehabilitation Medicine; B.S., 1963, Michigan State; Ph.D., 1969, Washington

ANDERSON, MAXINE K., 1972, Instructor in Psychiatry and Behavioral Sciences; B.A., 1963, Stanford; M.D., 1967, California (San Francisco)

ANDERSON, PHILIP W., 1972, Instructor in Radiology; B.A., 1962, M.D., 1966, Washington

ANDERSON, ROBERT ARNOLD,\* 1965 (1973), Professor of Education; B.S., 1952, Ph.D., 1964, Minnesota

ANDERSON, SYLVIA FINLAY, 1920 (1947), Assistant Professor Emeritus of English; B.A., 1919, M.A., 1923, Washington

ANDERSON, VIRGINIA K., 1956, Assistant Professor of Dental Hygiene; B.S., 1952, Washington

ANDREWS, ELIZABETH A., 1968, Lecturer in Comparative Nursing Care Systems; Director, Nursing Services, Harborview Medical Center; B.S., 1950, Simmons; M.N., 1966, Washington

ANDREWS, RICHARD L.,\* 1968 (1971), Associate Professor of Education; B.S., 1962, Indiana State; M.S., 1965, Ph.D., 1968, Purdue

ANDREWS, WALTER G.,\* 1968 (1970), Assistant Professor of Near Eastern Languages and

Literature (Turkish) and Near Eastern Studies; B.A., 1961, Carleton; M.A., 1963, 1965, Ph.D., 1970, Michigan

ANKELE, FELICE, 1927 (1952), Assistant Professor Emeritus of German; B.A., 1925, M.A., 1926, Ph.D., 1936, Washington

ANSELL, JULIAN S., 2959 (1965), Professor and Chairman of Urology; B.A., 1947, Bowdoin; M.D., 1951, Tufts; Ph.D., 1959, Minnesota

APPLEBAUM, DEBORAH M., 1972, Research Associate in Medicine; B.S., 1966; Ph.D., 1972, Washington

ARANDA, ROBERT G., 1971, Instructor in Health Services; B.S., 1972, San Diego State

ARCHBOLD, THOMAS F.,\* 1961 (1973), Professor of Metallurgical Engineering; B.S. in Met.E., 1955, M.S. in Met.E., 1957, Ph.D. (Met.E.), 1961, Purdue

AREND, WILLIAM P., 1964 (1972), Assistant Professor of Medicine; B.A., Cum Laude, 1959, Williams; M.D., 1964, Columbia

ARESTAD, SVERRE, 1937 (1958), Professor Emeritus of Scandinavian Languages and Comparative Literature; B.A., 1929, Ph.D., 1938, Washington

ARMSTRONG, HUBERT E., 1966 (1972), Associate Professor of Psychiatry and Behavioral Sciences; B.A., 1957, Willamette; Ph.D., 1963, Syracuse

ARMSTRONG, JACOB C., 1972, Assistant Professor of Aerospace Studies; B.S., 1964, United States Military Academy; M.S.C.E., 1967, New Hampshire

ARONS, ARNOLD B.,\* 1968, Professor of Physics; M.E., 1937, M.S., 1940, Stevens Institute of Technology; M.S. (Hon.), 1953, Amherst; Ph.D., 1943, Harvard

ARSOVE, MAYNARD GOODWIN,\* 1951 (1961), Professor of Mathematics; B.S., 1943, Lehigh; Sc.M., 1948, Ph.D., 1950, Brown

ARUNDALE, ROBERT B.,\* 1971, Assistant, Professor of Speech; B.S., 1963, M.S., 1964, Rensselaer Polytechnical Institute; Ph.D., 1971, Michigan Sate

ARYA, SATYA P. S., 1969, Research Assistant Professor of Atmospheric Sciences; B.S., 1958, B.E., 1961, M.E., 1964, Roorkee; Ph.D., 1968, Colorado State

ATKINS, JOHN R.,\* 1964 (1973), Associate Professor of Anthropology and Comparative Nursing Care Systems; B.S., 1950, Northwestern; M.A., 1954, Pennsylvania

AUGEROT, JAMES E.,\* 1969 (1972), Associate Professor of Slavic and Balkan Linguistics and Languages, and Russian and East European Studies; B.A., 1956, M.A., 1959, New Mexico Highland; Ph.D., 1968, Washington

AULD, MARGARET E., 1968 (1972), Assistant Professor of Physiological Nursing; B.S., 1967, M.N., 1968, Washington

AUTH, DAVID C.,\* 1969 (1973), Associate Professor of Electrical Engineering; A.B., 1962, Catholic University of America; M.S., 1966, Ph.D., 1969, Georgetown

AVANN, SHERWIN PARKER,\* 1946 (1962), Associate Professor of Mathematics; B.S., 1938, Washington; M.S., 1940, Ph.D., 1942, California Institute of Technology

AWAD, ISAM S., 1972, Lecturer in Civil Engineering; B.Sc. in C.E., 1964, Cairo; M.Sc. in C.E., 1966, Washington; Ph.D., 1972, Washington

AXELSSON, G.-A., 1973, Associate Professor of Otolaryngology; M.K., 1953, Med. lic. (M.D.), 1957, Goteborg, Sweden



BABB, ALBERT LESLIE,\* 1952 (1960), Professor of Nuclear Engineering and Chemical Engineering; Chairman, Department of Nuclear Engineering; B.A.Sc., 1948, British Columbia; M.S., 1949, Ph.D., 1951, Illinois

BABB, WARREN,\* 1955 (1968), Associate Professor of Music; B.A., 1938, M.A., 1939, Harvard

BACHARACH, JERE L.,\* 1967 (1973), Associate Professor of History and Near Eastern Studies; B.A., 1960, Trinity; M.A., 1962, Harvard; Ph.D., 1967, Michigan

BACKUS, FRANK I., 1968 (1972), Lecturer in Psychiatry and Behavioral Sciences; B.S., 1958, Washington State; M.D., 1962, Washington

BADGLEY, FRANKLIN I.,\* 1950 (1967), Professor of Atmospheric Sciences; Associate Director, Quaternary Research Center; B.S., 1935, Chicago; M.S., 1948, Ph.D., 1951, New York University

BAILY, ATHOL ROMAYNE,\* 1949 (1964), Professor of Education; B.S., 1931, Kansas State Teachers; M.A., 1936, Ed.D., 1949, Missouri

BAIR, WILLIAM J., 1957, Lecturer PT in Radiology; B.A., 1949, Ohio Wesleyan; Ph.D., 1954, Rochester

BAKER, D. JAMES, JR., 1973, Research Associate Professor of Oceanography; B.S., 1958, Stanford; Ph.D., 1962, Cornell

BAKER, MARCIA B., 1971, Research Associate in Civil Engineering; B.A., 1959, Cornell; M.S., 1960, Stanford; Ph.D., 1971, Washington

BAKER, MARSHALL,\* 1962 (1966), Professor of Physics; B.A., 1953, Ph.D., 1958, Harvard

BAKER, RICHARD M., 1972, Assistant Professor of Family Medicine; A.B., 1961, Oberlin; M.D., 1965, Case Western Reserve

BAKER, SAMUEL R., 1969 (1973), Instructor in Orthopaedics; B.A., 1961, Dartmouth; M.D., 1966, Washington

BAKKEN, AIMÉE H., 1973, Assistant Professor of Zoology; B.A., 1963, Chicago; Ph.D., 1970, Iowa

BAKKER, CORNELIUS B., 1960 (1972), Professor of Psychiatry and Behavioral Sciences; M.D., 1952, Utrécht

BALISE, PETER LOUIS, JR,\* 1950 (1961), Professor of Mechanical Engineering; S.B., 1948, S.M., 1950, Massachusetts Institute of Technology

BALTZO, RALPH M., 1955 (1967), Director, Radiation Safety, Environmental Health and Safety; Lecturer in Radiology; B.A., 1950, Washington

BANIGAN, MARY J., 1972, Instructor in Maternal and Child Nursing; Diploma, 1949, Seton School of Nursing; B.S., 1956, College Mt. St. Joseph; M.S., 1971, Colorado

BANKS, JAMES A.,\* 1969 (1973), Professor of Education; B.Ed., 1964, Chicago Teachers' College; M.A., 1967, Ph.D., 1969, Michigan State

BANSE, KARL,\* 1959 (1966), Professor of Oceanography; Ph.D., 1955, Kiel University

BANTA, MARTHA,\* 1970, Associate Professor of English; A.B., 1950, Ph.D., 1964, Indiana

BARASH, DAVID P.,\* 1973, Assistant Professor of Psychology; B.A., 1966, Harpur; M.A., 1968, Ph.D., 1970, Wisconsin

BARD, STEPHEN A., 1969, Lecturer in Biochemistry; B.A., 1960, Northwestern; M.S., 1968, Washington

BARE, BARRY BRUCE,\* 1969, Assistant Professor of Fisheries and Forest Resources; B.S.F., 1964, Purdue; M.S., 1965, Minnesota; Ph.D., 1969, Purdue

BARKER, EDWARD ALLAN,\* 1970 (1971), Assistant Professor of Pathology; Chief, Pathology Service, Harborview Medical Center; B.A., 1960, M.D., 1964, Ph.D., 1970, Washington

BARKSDALE, JULIAN D., 1936 (1973), Professor Emeritus of Geological Sciences; A.B., 1930, Stanford; Ph.D., 1936, Yale

BARNARD, KATHRYN E.,\* 1963 (1972), Professor of Maternal and Child Nursing; B.S., 1960, Nebraska; M.S., 1962, C.A.G.S., 1963, Boston University; Ph.D., 1972, Washington

BARNES, CLIFFORD A., 1947 (1956), Professor Emeritus of Oceanography; B.S., 1930, Ph.D., 1936, Washington

BARNES, GLOVER W.,\* 1969, Associate Professor of Urology; Lecturer in Microbiology; B.Sc., 1949, Akron; M.A., 1956, Ph.D., 1962, State University of New York (Buffalo)

BARRACK, CHARLES M.,\* 1968 (1969), Assistant Professor of Germanic Languages and Literature; B.A., 1961, San Diego State; M.A., 1966, Ph.D., 1969, Washington

BARTH, ERNEST A. T.,\* 1955 (1968), Professor of Sociology; B.A., 1950, Rochester; M.A., 1953, Ph.D., 1956, North Carolina

BARZEL, YORAM,\* 1961 (1970), Professor of Economics; B.A., 1953, M.A., 1956, Hebrew University (Jerusalem); Ph.D., 1961, Chicago

BASHEY, HUSAIN I., 1969 (1970), Assistant Professor of Education; B.A., 1952, M.A., 1955, University of Bombay; M.A., 1958, MacMurray

BASKERVILLE, BARNET,\* 1948 (1960), Professor of Speech; B.S., 1940, M.A., 1944, Washington; Ph.D., 1948, Northwestern

BASS, ROBERT A., 1970, Assistant Professor of Education; B.S., 1950, M.A., 1953, Pittsburgh State Teachers

BASSETT, LOWELL R.,\* 1966 (1970), Associate Professor of Economics; B.S.M.E., 1959, Carnegie Institute of Technology; M.S., 1964, Ph.D., 1966, Purdue

BATEY, MARJORIE V.,\* 1956 (1970), Professor of Comparative Nursing Care Systems; Diploma, 1947, Sacred Heart Hospital, Spokane; B.S., 1953, Washington; M.S., 1956, Ph.D., 1968, Colorado

BATIE, HARRIETT VIRGINIA, 1941 (1954), Assistant Professor Emeritus of Education; B.S., 1935, Hastings; M.A., 1945, Ph.D., 1953, Washington

BAUER, HARRY C., 1945 (1967), Professor Emeritus of Librarianship; A.B., 1927, M.S., 1929, Washington (St. Louis); Certificate of Librarianship, 1931, St. Louis Library School

BAUER, PATRICIA,\* 1970 (1972), Associate Professor of Art; B.F.A., 1962, M.F.A., 1964, Washington

BAUMGARTNER, DONALD J., 1973, Affiliate Associate Professor of Civil Engineering; B.S., 1955, Illinois (Urbana); M.S., 1958, Massachusetts Institute of Technology; Ph.D., 1967, Oregon State University

BAYLINK, DAVID J., 1966 (1972), Associate Professor of Medicine; B.A., 1963, Walla Walla; M.D., 1957, Loma Linda

BEACH, LEE ROY,\* 1966 (1972), Professor of Psychology; B.A., 1957, M.A., 1959, Ph.D., 1961, Colorado BEAL, JACK L., 1973, Assistant Professor of Education; B.A., 1957, M.S., 1962, Kansas; Ph.D., 1972, Nebraska

BEALE, JAMES MACARTHUR, JR.,\* 1948 (1968), Professor of Music; B.A., 1945, Harvard; B.Mus., 1946, M.Mus., 1947, Yale

BEASLEY, R. PALMER,\* 1967 (1972), Associate Professor of Epidemiology and International Health; Adjunct Associate Professor of Medicine; A.B., 1958, Dartmouth; M.D., 1962, Harvard; M.S., 1969, Washington

BEATTY, DAVID J.,\* 1971, Associate Professor of Social Work; B.A., 1960, Maryland; M.A., 1965, Indiana; D.S.W., 1971, California (Berkeley)

BEATY, HARRY N., 1965 (1971), Associate Professor of Medicine; Medical Director, Providence Hospital; B.A., 1954, M.D., 1958, Washington

BEAUMONT, ROSS ALLEN,\* 1940 (1954), Professor of Mathematics; A.B., 1936, M.S., 1937, Michigan; Ph.D., 1940, Illinois

BECKER, JOSEPH,\* 1965 (1968), Professor of Psychiatry and Behavioral Sciences and Psychology; A.B., 1950, M.A., 1952, George Washington; Ph.D., 1958, Duke

BECKLY, DAVID E., 1973, Instructor in Radiology; M.B., B.S., L.R.C.P., 1966, Middlesex Hospital Medical School (London)

BECKMANN, GEORGE M.,\* 1969, Professor of East Asian Studies; Dean, College of Arts and Sciences; A.B., 1948, Harvard; Ph.D., 1952, Stanford

BECKWITH, JOHN BRUCE,\* 1964 (1971), Associate Professor of Pathology and Pediatrics; B.A., 1954, Whitman; M.D., 1958, Washington

BEDER, OSCAR E.,\* 1952 (1960), Professor of Prosthodontics; Director, Maxillofacial Prosthesis Clinic; B.S., 1936, Rutgers; D.D.S., 1941, Columbia

BEHLER, DIANA E.,\* 1969 (1971), Assislant Professor of Germanic Languages and Literature and Comparative Literature; B.A., 1965, M.A., 1966, Ph.D., 1970, Washington

BEHLER, ERNST H.,\* 1965 (1966), Professor of Germanic Languages and Literature and Comparative Literature; Associate Chairman of Comparative Literature; Ph.D., 1951, Munich

BEHRENS, JOYCE, 1972, Instructor in Laboratory Medicine, Division of Medical Technology; B.S., 1966, Illinois; M.S., Minnesota

BELKNAP, BENJAMIN H., 1971, Associate Professor of Medicine; B.A., 1952, M.P.A., 1954, M.D., 1961, Rochester

BELL, ALDON D.,\* 1969, Associate Professor of History; Associate Dean, College of Arts and Sciences; Director, Office for Undergraduate Studies; B.A., 1951, Oklahoma; B.A., 1953, Ph.D., 1961, Oxford

BELL, CECIL H., JR.,\* 1968 (1972) Associate Professor of Administrative Theory and Organizational Behavior; B.A., 1957, M.A., 1959, Ph.D., 1968, Boston

BELL, EARL J.,\* 1966 (1969), Associate Professor of Urban Planning; B.A., 1952, B.S., 1957, Ph.D., 1965, California (Berkeley)

BELL, MILO CARSNER,\* 1940 (1963), Professor of Fisheries; B.S. in M.E., 1930, Washington

BELTZ, WILLIAM R., Appointed Assistant Professor of Naval Science; B.A., 1968, Auburn

BENDA, MIROSLAV,\* 1972, Assistant Professor of Mathematics; M.Sc., 1968, Warsaw; Ph.D., 1970, Wisconsin BENDERSKY, MARTIN,\* 1972 (1973), Assistant Professor of Mathematics; B.S., 1966, City College, New York; Ph.D., 1971, California (Berkeley)

BENDICH, ARNOLD J.,\* 1970, Assistant Professor of Botany; Adjunct Assistant Professor of Genetics; B.A., 1962, Vermont; Ph.D., 1969, Washington

BENDITT, EARL P.,\* 1957, Professor and Chairman of Pathology; B.A., 1937, Swarthmore; M.D., 1941, Harvard

BENEDICT, ROBERT G., 1960 (1964), Research Associate Professor of Civil Engineering; B.S., 1936, Michigan State; M.S., 1938, Virginia Polytechnic'Institute; Ph.D., 1942, Wisconsin

BENNE, MAE M.,\* 1965 (1970), Associate Professor of Librarianship; Acting Associate Director, School of Librarianship; B.S., 1950, Nebraska; M.S., 1955, Illinois

BENNETT, DELMOND N.,\* 1963 (1968), Associate Professor of Speech; B.A., 1955, M.A., 1958, Ph.D., 1963, Washington

BENOLIEL, JEANNE Q.,\* 1970, Professor of Comparative Nursing Care Systems; Chairman, Department of Comparative Nursing Care Systems; Diploma, 1941, St. Luke's Hospital; B.S., 1948; Oregon State; M.S., 1955, D.N.S., 1969, California (San Francisco)

BENSHOOF, KENNETH, 1966 (1968), Assistant Professor of Music; B.A., 1957, Washington; M.A., 1963, San Francisco State

BENTLEY, G. NELSON,\* 1952 (1967), Associate Professor of English; A.B., 1941, M.A., 1945, Michigan

BERG, JOHN C.,\* 1964 (1973), Professor of Chemical Engineering; B.S., 1960, Carnegie Institute of Technology; Ph.D., 1964, California (Berkeley)

BERG, KENNETH B.,\* 1950 (1957), Professor of Accounting; B.S., 1939, North Dakota; M.S., 1941, Ph.D., 1952, Illinois; C.P.A., 1954, State of Washington

BERGMAN, ABRAHAM B.,\* 1964 (1968), Associate Professor of Pediatrics and Health Services; B.A., 1954, Reed; M.D., 1958, Western Reserve

BERGNER, MARILYN, 1972, Assistant Professor of Health Services; B.A., 1953, Brooklyn; Ph.D., 1970, Columbia

BERGSETH, FREDERICK ROBERT,\* 1947 (1957), Professor of Electrical Engineering; Assoclate Chairman, Department of Electrical Engineering; B.S. in E.E., 1937, Washington; S.M. in E.E., 1938, Massachusetts Institute of Technology

BERGSMA, WILLIAM,\* 1963, Professor of Music; B.A., 1942, M.M., 1943, Eastman School of Music, Rochester

BERLIN, IRVING N., 1965, Professor of Psychiatry and Behavioral Sciences and Pediatrics; Head, Division of Child Psychiatry; A.B., 1939, M.D., 1943, California (Los Angeles)

BERLIN, SHARON B., 1972, Lecturer in Social Work; B.A., 1964, College of Idaho; M.S.W., 1966, Washington; Advanced Study, 1971, California (Berkeley)

BERNI, ROSEMARIAN, 1967 (1973), Assistant Professor of Rehabilitation Medicine; B.S., 1947, University of Oregon School of Nursing

BERNSTEIN, IRVIN D., 1973, Assistant Professor of Pediatrics; B.S., 1963, Trinity College; M.D., 1967, New York University

BERRY, HERBERT C., 1972, Instructor in Radiology; B.S., 1962, M.D., 1966, Illinois BERTEAUX, RICHARD, 1967, Assistant Professor of Architecture; A.B., 1953, California (Los Angeles); B.A., 1962, California (Berkeley)

BESSMER, DANIEL, 1973, Research Associate in Environmental Health; A.B., 1942, A.M., 1947, Stanford

BESTOR, ARTHUR,\* 1962, Professor of History; Ph.B., 1930, Ph.D., 1938, Yale; M.A., 1956, Oxford; LL.D., 1959, Lincoln (Pennsylvania)

BETHEL, JAMES S.,\* 1962, Professor of Forest Resources; Dean, College of Forest Resources; B.S.F., 1937, Washington; M.F., 1939, D.F., 1947, Duke

BEVAN, DONALD EDWARD,\* 1959 (1969), Professor of Fisheries and Wildlife Science; Assistant Vice President for Research; Adjunct Professor of Marine Studies; B.S., 1948, Ph.D., 1959, Washington

BEVIS, L. DOROTHY, 1947 (1971), Professor Emeritus of Librarianship; B.A., 1927, Pomona; B.S. in L.S., 1947, Southern California; M.A., 1951, Washington

BEYÈRS, WILLIAM B.,\* 1967 (1968), Assistant Professor of Geography; B.A., 1962, Ph.D., 1967, Washington

BICHSEL, HANS, 1969 (1972), Professor of Radiology; Ph.D., 1951, Basel

BICKNELL, JAMES N., 1972, Lecturer in Biology Instructional Program; B.S., 1960, Ph.D., 1969, Washington

BIEDENBACH, MARIA A., 1966 (1972), Research Assistant Professor of Physiology and Biophysics; A.B., 1960, Ph.D., 1964, California (Berkeley)

BIERMAN, EDWIN L., 1962 (1968), Professor of Medicine; A.B., 1951, Brooklyn; M.D., 1955, Cornell

BILL, WILLARD E., 1971 (1972), Lecturer in Education; B.A., 1961, Central Washington State College

BIRD, WINFRED WYLAM, 1928 (1973), Associate Professor Emeritus of Speech; A.B., 1926, Lawrence; Ph.D., 1938, Iowa

BIRKELAND, HALVARD W., 1963, Affiliate Professor of Civil Engineering; B.S. in C.E., 1932, M.S. in C.E., 1933, C.E., 1944, Washington

BIRNBAUM, ZYGMUNT WILLIAM,\* 1939 (1950), Professor Emeritus of Mathematics; Director, Laboratory of Statistical Research; LL.M., 1925, Ph.D., 1929, John Casimir, Poland

BISSELL, WILLIAM, 1970, Assistant Professor of Music; B.Mus. Ed., 1952, Willamette; M.S., 1956, Illinois

BJORKSTAM, JOHN L.,\* 1955 (1965), Professor of Electrical Engineering; B.S. in E.E., 1949, M.S. in E.E., 1952, Ph.D., 1958, Washington

BLACIC, JAMES D.,\* 1970, Assistant Professor of Geophysics and Geological Sciences; A.B., 1964, Ph.D., 1970, California (Los Angeles)

BLACK, ALBERT W., JR., 1972, Acting Assistant Professor of Sociology; B.A., 1963, Michigan; M.A., 1968, Wayne State

BLACK, RICHARD G., 1971, Assistant Professor of Anesthesiology; B.A.Sc., 1954, M.D., 1960, Toronto

BLACKMAN, ALLAN, 1972, Instructor in Health Services; B.A., 1958, Reed; M.C.P., 1966, California (Berkeley)

BLACKMON, JOHN R., 1962 (1969), Associate Professor of Medicine; B.S., 1952, Mount Union; M.D., 1956, Western Reserve BLAGG, CHRISTOPHER R., 1966 (1972), Associate Professor of Medicine; M.B., Ch.B., 1954, M.D., 1964, Leeds

BLAINEY, CAROL A., 1967 (1970), Assistant Professor of Physiological Nursing; B.S., 1962, Oregon; M.N., 1967, Washington

BLAIR, ANDREW D., 1966 (1972), Research Associate in Medicine; B.S.P., 1964, British Columbia; Ph.D., 1972, Washington

BLAIR, JOHN SANBORN,\* 1952 (1961), Professor of Physics; B.S., 1943, Yale; M.S., 1949, Ph.D., 1951, Illinois

BLAKE, KATHLEEN ANN, 1971, Assistant Professor of English; A.B., 1966, San Diego State; M.A., 1967, California (Los Angeles); Ph.D., 1971, California (San Diego)

BLALOCK, HUBERT M.,\* 1971, Professor of Sociology; A.B., 1949, Dartmouth; M.A., 1953, Brown; Ph.D., 1954, North Carolina

BLANDAU, RICHARD J.,\* 1949 (1951), Professor of Biological Structure; A.B., 1935, Linfield; Ph.D., 1939, Brown; M.D., 1948, Rochester

BLASER, H. WESTON,\* 1946 (1973), Professor of Botany; B.S., 1931, A.M., 1933, Temple; Ph.D., 1940, Cornell

BLEDSOE, LEWIS JACKSON, 1971, Research Assistant Professor of Fisheries and Center for Quantitative Sciences in Forestry, Fisheries, and Wildlife Management; A.B., 1964, Tennessee; M.S., 1968, Colorado State

BLESSING, RICHARD ALLEN,\* 1970 (1973), Associate Professor of English; A.B., 1961, Hamilton; M.A., 1963, Ph.D., 1967, Tulane

BLIQUEZ, LAWRENCE JOHN,\* 1969 (1970), Assistant Professor of Classics; B.A., 1963, St. Mary's (California); Ph.D., 1968, Stanford

BLOOD, HOWARD L., 1970, Professor of Electrical Engineering; Director, Applied Physics Laboratory; B.S., 1947, Utah State; Ph.D., 1955, Washington

BLOOMQUIST, DALE, 1972, Assistant Professor of Oral Surgery; D.D.S., 1969, Washington; M.S., 1972, Georgetown

BLUMENTHAL, ROBERT McCALLUM,\* 1956 (1965), Professor and Chairman of Mathematics; B.A., 1952, Oberlin; Ph.D., 1956, Cornell

BLUMSTEIN, PHILIP W.,\* 1969 (1970), Assistant Professor of Sociology; B.A., 1966, Reed; M.A., 1967, Ph.D., 1970, Vanderbilt

BOATMAN, EDWIN S.,\* 1961 (1972), Associate Professor of Environmental Health; B.S., 1952, British Postgraduate Medical School; M.S., 1961, Ph.D., 1967, Washington

BOBA, IMRE,\* 1962 (1971), Professor of History and Russian and East European Studies; Ph.D., 1962, Washington

BODANSKY, DAVID,\* 1954 (1963), Professor of Physics; B.S., 1943, M.A., 1948, Ph.D., 1950, Harvard

BODDEN, RODNEY,\* 1965 (1969), Assistant Professor of Spanish Language and Literature and Latin American Studies; B.A., 1955, West Indies (Jamaica); M.A., 1961, Toronto; Ph.D., 1969, Wisconsin

BODEMER, CHARLES W.,\* 1956 (1968), Professor and Chairman of Biomedical History; B.A., 1951, Pomona; M.A., 1952, Claremont; Ph.D., 1956, Cornell

BODOIA, JOHN RODGER, \* 1964 (1966), Associate Professor of Mechanical Engineering; B.S. in M.E., 1956, M.S., 1957, Ph.D., 1959, Carnegie Institute of Technology



BOEKER, ELIZABETH A., 1972, Research Assistant Professor of Biochemistry; A.B., 1962, Radcliffe; Ph.D., 1967, California (Berkeley)

BOGAN, RICHARD H.,\* 1954 (1965), Professor of Civil Engineering; B.S. in C.E., 1949, Washington; S.M., 1952, Sc.D., 1954, Massachusetts Institute of Technology

BÖHM-VITENSE, ERIKA,\* 1968 (1971), Professor of Astronomy; B.S., 1946, M.S., 1948, Ph.D., 1951, University of Kiel

BÖHM, KARL-HEINZ,\* 1967, Professor of Astronomy; B.S., 1950, M.S., 1951, Ph.D., 1954, University of Kiel

BOLENDER, CHARLES L.,\* 1959 (1968), Professor and Chairman of Prosthodontics; D.D.S., 1956, M.S., 1957, Iowa

BOLER, JOHN F.,\* 1960 (1965), Associate Professor of Philosophy; A.B., 1950, Creighton; M.A., 1952, St. Louis; Ph.D., 1960, Harvard

BOLIN, ROSE M., 1972, Instructor in Physiological Nursing; Diploma, 1969, St. Vincent School of Nursing; B.S.N., 1971, M.A., 1972, Iowa

BOLING, JOHN L., 1969 (1973), Research Professor of Biological Structure; B.A., 1931, Linfield; Ph.D., 1935, Brown

BOLING, JOSEPH E., Captain, United States Army, 1973, Assistant Professor of Military Science; S.B., 1964, Metallurgy and Materials Science, Massachusetts Institute of Technology; M.B.A., 1973, Washington

BOLLARD, RICHARD JOHN H.,\* 1961, Professor and Chairman of Aeronautics and Astronautics; B.E. in C.E., 1948, M.E. in Struct.E., 1949, New Zealand; Ph.D., 1954, Purdue

BOLLES, ROBERT C.,\* 1966 (1967), Professor of Psychology; B.A., 1948, M.S., 1949, Stanford; Ph.D., 1956, California (Berkeley)

BOLLINGER, RICK L., 1971, Instructor in Rehabilitation Medicine; B.A., M.A., 1967, San Francisco State; Ph.D., 1970, Washington

BOLTON, DALE LEROY,\* 1962 (1969), Professor of Education; B.S., 1950, M.S., 1953, Oklahoma State; Ph.D., 1958, Wisconsin

BONE, HUGH A.,\* 1948, Professor of Political Science; B.A., 1931, North Central; M.A., 1935, Wisconsin; Ph.D., 1937, Northwestern

BONHAM, KELSHAW, 1944 (1968), Research Professor of Fisheries; B.S., 1931, M.S., 1935, Ph.D., 1937, Washington

BONICA, JOHN J., 1960, Professor and Chairman of Anesthesiology; Director, Pain Clinic; Director, Anesthesia Research Center; Chairman, Perinatal Biology Group; B.S., 1938, New York University; M.D., 1942, Marquette

BONSTEEL, DAVID,\* 1964 (1969), Associate Professor of Architecture; B.Arch., 1950, Washington State; M.A., 1964, Washington

BOOKER, JOHN R.,\* 1971, Assistant Professor of Geophysics; B.S., 1963, Stanford; M.S., 1965, Ph.D., 1968, California (San Diego)

BOOTH, JAMES L., 1973, Assistant Professor of English; B.A., 1963, Glenville State; M.A., 1967, West Virginia; Ph.D., 1973, Purdue

BOOZER, MARY K.,\* 1956 (1972), Associate Professor of Physiological Nursing; B.S., 1947, Colorado; M.N., 1955, Washington

BORDEN, WESTON THATCHER,\* 1972, Associate Professor of Chemistry; B.A., 1964, M.A., 1966, Ph.D., 1968, Harvard

BORIS, RUTHANNA, 1965 (1972), Professor of Drama; Director of Dance

BORNSTEIN, PAUL,\* 1966 (1969), Professor of Medicine and Biochemistry; B.A., 1954, Cornell; M.D., 1958, New York BOROUGHS, HOMER, Jr.,\* 1948 (1964), Professor of Education; Assistant Dean, College of Education; B.A., 1939, Western Washington College of Education; M.A., 1947, Ph.D., 1949, Washington.

BOSCHA, M. VICKIE, 1972, Research Associate in Health Services; B.A., 1970, California (Los Angeles); M.A., 1972, Washington

BOSE, CHRISTINE E., 1973, Assistant Professor of Sociology; B.A., 1969, Wagner; Ph.D., 1973, Johns Hopkins

BOSMAJIAN, HAIG A.,\* 1965 (1973), Professor of Speech; B.A., 1949, California; M.A., 1951, Pacific; Ph.D., 1959, Stanford

BOSTROM, ROBERT C.,\* 1964 (1969), Professor of Geological Sciences and Geophysics; B.A., 1949, M.A., 1952, D.Phil., 1961, Oxford

BOSWORTH, THOMAS L.,\* 1968, Professor of Architecture; B.A., 1952, M.A., 1954, Oberlin; M.A., 1960, Yale

BOTTING, DAVID CHARLES, JR., 1955 (1961), Associate Professor of Humanistic-Social Studies; B.A., 1940, M.A., 1947, Washington; Ph.D., 1950, Chicago

BOUDREAUX, FRANK J., 1973, Assistant Professor of Aerospace Studies; B.S., 1962, Grambling; M.S., 1971, Southern California

BOULWARE, DAVID G.,\* 1965 (1973), Professor of Physics; A.B., 1958, California (Berkeley); M.S., 1960, Ph.D., 1962, Harvard

BOURQUE, PHILIP J.,\* 1957 (1962), Professor of Business Economics; A.B., 1949, Massachusetts; M.A., 1950, Ph.D., 1956, Pennsylvania

BOVY, BARBARA JEAN, 1971, Instructor in Home Economics: B.S., 1960, Idaho; M.A., 1971, Washington

BOWDEN, DOUGLAS M., 1969 (1973), Associate Professor of Psychiatry and Behavioral Sciences; B.A., 1959, Harvard; M.D., 1965, Stanford

BOWEN, LAWRENCE, 1973, Assistant Professor of Communications; B.A., 1968, Pennsylvania State; M.A., 1970, Ph.D., 1973, Wisconsin

BOWIE, DOROTHEE N., 1946 (1971), Lecturer in English; Director of Advising; B.S., 1957, M.A.T., 1968, Washington

BOWING, SHIRLEY, 1958, Instructor in Rehabilitation Medicine; B.S., 1943, Minnesota; Occupational Therapy Certificate, 1945, Columbia; M.A., 1955, Southern California

BOYCE, RONALD R.,\* 1964 (1965), Associate Professor of Geography; B.S., 1956, M.S., 1957, Utah; Ph.D., 1961, Washington

BOYDEN, EDWARD A., 1954 (1956), Research Professor of Biological Structure; A.B., 1909, A.M., 1911, Ph.D., 1916, Harvard; F.C.C.P. (Hon.), 1961

BOYNTON, PAUL E.,\* 1970, Assistant Professor of Astronomy; B.A., 1961, Wesleyan; Ph.D., 1967, Princeton

BRACHT, NEIL F.,\* 1970, Associate Professor of Social Work; Chairman, Community Organization Track; B.S., 1959, Loyola; M.A., 1961, Chicago; M.P.H., 1964, Michigan

BRADLEY, GORDON A., 1972 (1973), Assistant Professor of Recreation and Resource Planning; B.S.L.A., 1969, California State Polytechnic; M.L.A., 1972, California

BRADY, LYNN R.,\* 1959 (1967), Professor of Pharmacognosy; Chairman, Department of Pharmaceutical Sciences; B.S., 1955, M.S., 1957, Nebraska; Ph.D., 1959, Washington

BRAKEL, HENRY LOUIS, 1905 (1947), Professor Emeritus of Physics; B.A., 1902, Olivet; M.A., 1905, Washington; Ph.D., 1912, Cornell BRAME, MICHAEL K.,\* 1971, Assistant Professor of Linguistics and Near Eastern Studies; B.A., 1966, Texas (Austin); Ph.D., 1970, Massachusetts Institute of Technology

BRAMMER, LAWRENCE M.,\* 1964 (1966), Professor of Education; B.S., 1943, St. Cloud State; M.A., 1948, Ph.D., 1950, Stanford

BRANDAUER, FREDERICK P., 1973, Assistant Professor of Chinese and East Asian Studies; B.A., 1955, Lebanon Valley; M.A., 1965, Pittsburgh; Ph.D., 1973, Stanford

BRANDT, EDNA M.,\* 1954 (1968), Associate Professor of Physiological Nursing; Diploma, 1939, St. Joseph's Hospital, Bloomington, Illinois; B.A., 1952, Redlands; M.N., 1953, Washington

BRANNON, ERNEST LEROY, 1973, Assistant Professor of Fisheries; B.S., 1959, Ph.D., 1971, Washington

BRASS, PAUL R.,\* 1965 (1973), Professor of Political Science and South Aslan Studies; A.B., 1958. Harvard; M.A., 1959, Ph.D., 1964, Chicago

BRAVMANN, RENE,\* 1968 (1972), Associate Professor of Art History; Chairman, African Studies; Adjunct Curator of Washington State Museum; M.A., 1965, Ph.D., 1971, Indiana

BRAZEAU, WENDELL,\* 1945 (1963), Professor of Art; B.A., 1933, M.F.A., 1947, Washington

BRAZIL, JOSEPH, 1969 (1972), Assistant Professor of Music

BREITENSTEIN, BRYCE, 1973, Research Associate in Environmental Health; M.D., 1958, Oregon; M.P.H., 1973, Washington

BRENGELMANN, GEORGE L.,\* 1966 (1972), Associate Professor of Physiology and Biophysics and Physiological Nursing; B.S., 1956, Rochester; Ph.D., 1967, Washington

BRENNAND, CHARLES, 1966, Lecturer in Music; B.A., 1951, Oberlin; M.A., 1952, Illinois

BRENNER, GERALD J., 1966, Assistant Professor of English; B.A., 1957, Colorado; M.A., 1960, San Francisco State; Ph.D., 1969, New Mexico

BRESLOW, NORMAN,\* 1968 (1972), Associate Professor of Biostatistics; B.A., 1962, Reed; Ph.D., 1967, Stanford

BREYSSE, PETER A.,\* 1957 (1972), Associate Professor of Environmental Health; B.S., 1952, Idaho; M.S., 1954, Washington State; M.P.H., 1957, Pittsburgh

BRIAR, J. SCOTT,\* 1971, Professor of Social Work; Dean, School of Social Work; A.B., 1950, Washburn; M.S.W., 1952, Washington (St. Louis); D.S.W., 1961, Columbia

BRIDGMAN, JON MARSHALL,\* 1961 (1970), Associate Professor of History; B.A., 1951, Ph.D., 1960, Stanford

BRIEN, FREDERICK B.,\* 1954 (1963), Professor of Metallurgical Engineering; B.S. in Min.E., 1950, Alberta; M.S. in Mineral E., 1951, Columbia

BRIGGS, JAMES ROBERT,\* 1947 (1968), Professor of Education; A.B., 1935, M.A., 1950, Washington; Ed.D., 1954, Stanford

BRIGGS, RICHARD M., 1972, Assistant Professor of Obstetrics and Gynecology; B.A., 1950, M.D., 1954, Columbia

BRINK, CHARLES B.,\* 1963, Professor of Social Work; B.A., 1932, Missouri; M.Sc., 1941, 3rd year Certificate, 1937, Western Reserve

BROCKENBROUGH, EDWIN C.,\* 1964 (1971), Associate Professor of Surgery; B.S., 1952, William and Mary; M.D., 1956, Johns Hopkins BROCKMAN, C. FRANK, 1946 (1968), Professor Emeritus of Forestry; B.S., 1924, Colorado State; M.S., 1931, Washington

BROCKWAY, DORIS J.,\* 1951, Associate Professor Emeritus of Home Economics; B.A., 1926, Washington State; M.A., 1939, Washington

BRODERSON, STEVAN H.,\* 1967 (1970), Assistant Professor of Biological Structure; B.Sc., 1960, Ohio State; Ph.D., 1967, New York (Buffalo)

BROEDEL, JOHN WESLEY,\* 1967, Associate Professor of Psychology and Education; Director, Counseling Center; B.S., 1950, M.S., 1955, Indiana State; Ed.D., 1958, Illinois

BROER, MARION RUTH, 1947 (1960), Professor Emeritus of Physical Education; B.S., 1933, M.S., 1936, Wisconsin; Ph.D., 1954, New York

BROOKS, CHARLES E., 1972, Instructor in Dental Hygiene; D.D.S., 1968, Texas

BROUGHTON, R. IRVING, 1971, Assistant Professor of Communications; B.A., 1965, M.A., 1967, Florida State; M.A., 1971, Hollins

BROVIAC, JOHN W., 1970 (1972), Instructor in Medicine; A.B., 1963, Villa Madonna; M.D., 1967, Cincinnati

BROWDER, ANN A.,\* 1971, Lecturer in Medicine; Associate Professor of Health Services; B.A., 1954, Wellesley; M.D., 1958, Johns Hopkins; M.P.H., 1968, Columbia

BROWN, ARTHUR C.,\* 1960 (1970), Professor of Physiology and Biophysics; B.A., 1948, M.S., 1954, Chicago; Ph.D., 1960, Washington

BROWN, COLIN B.,\* 1969 (1970), Professor of Civil Engineering; B.Sc., 1953, Kings College (London); Ph.D., 1962, Minnesota

BROWN, EDWARD G., 1948 (1949), Professor Emeritus of Business Policy; A.B., 1929, Washington; M.B.A., 1932, Harvard

BROWN, FRANCES A., 1953 (1969), Associate Professor of Education; B.Sc.Ed., 1940, Nebraska; M.A., 1950, Columbia

BROWN, GARDNER M., JR.,\* 1965 (1973), Associate Professor of Economics; Adjunct Associate Professor of Environmental Studies; A.B., 1959, Antioch; Ph.D., 1964, California (Berkeley)

BROWN, GEORGE W., JR.,\* 1967, Associate Professor of Fisheries; B.S., 1950, M.A., 1951, Ph.D., 1955, California (Berkeley)

BROWN, LOWELL S.,\* 1968 (1971), Professor of Physics; A.B., 1956, California (Berkeley); M.A., 1958, Ph.D., 1961, Harvard

BROWN, MALCOLM JOHNSTON,\* 1944 (1968), Professor of English; B.A., 1931, Ph.D., 1936, Washington

BROWN, ROBERT LEWIS,\* 1965 (1969), Associate Professor of Education; B.A., 1953, Iowa State Teachers College; M.Ed., 1956, Trinity; Ed.D., 1961, Arkansas

BROWN, S. DARDEN, 1930 (1962), Professor Emeritus of Business Law; LL.B., 1925, B.A., 1932, Washington; LL.M., 1938, Stanford; admitted to practice in Washington

BROWN, WALTER S., 1972, Assistant Professor of Education; B.A., 1966, M.Ed., 1968, Washington; Ph.D., 1972, Michigan State

BROWNELL, FRANCIS HERBERT III,\* 1950 (1961), Professor of Mathematics; B.A., 1943, M.S., 1947, Yale; Ph.D., 1949, Princeton

BRUCE, ROBERT A., 1950 (1959), Professor of Medicine; B.S., 1938, Boston; M.S., 1940, M.D., 1943, Rochester

BRUIN, WILLIAM J., 1972, Research Associate in Medicine; B.A., 1964; Ph.D., 1969, Michigan State BRUNO, PAULINE M.,\* (1958) 1973, Associate Professor of Physiological Nursing; B.S., 1952, M.N., 1954, Catholic University of America; D.N.Sc., 1971, California (San Francisco)

BRUNZELL, JOHN D., 1966 (1972), Assistant Professor of Medicine; A.B., 1959, Whitman; M.D., 1963, Washington

BRYANT, BENJAMIN SMYTH,\* 1949 (1969), Professor of Wood. Science and Technology; B.S.F., 1947, M.S.F., 1948, Washington; D.F., 1951, Yale

BRYANT, JEAN S., 1965, Research Associate in Medicine; B.A., 1946, Washington

BRYANT, VERNON E.,\* 1969 (1973), Associate Professor of Social Work; Director, Social Work Continuing Education; B.A., 1966, Seattle University; M.S.W., 1968, Washington

BUCHANAN, ROBERT T., 1971, Associate Professor and Chairman of Landscape Architecture; B.S., 1955, M.L.A., 1956, Harvard

BUCK, GEORGE CRAWFORD,\* 1950 (1962), Associate Professor and Chairman of Germanic Languages and Literature; Director, Language Laboratory and the Center for Programmed Instruction; B.A., 1942, Amherst; M.A., 1948, Ph.D., 1954, Yale

BUCK, VERNON E.,\* 1968, Associate Professor of Administrative Science; B.A., 1956, Yale; M.S., 1960, Ph.D., 1963, Cornell

BUCKLEY, ROBERT WILLIAM, 1942 (1960), Assistant Professor of Physical Education; B.A., 1950, Washington

BUCKNER, CLARENCE DEAN, 1961 (1973), Associate Professor of Medicine; B.S., 1957, Michigan State; M.D., 1961, Michigan

BUERGEL, NANCY SUE, 1973, Lecturer in Home Economics; B.A., 1963, Fort Wright; M.S., 1966, Iowa State

BUNGART, LUTZ,\* 1966, Associate Professor of Mathematics; Ph.D., 1962, Princeton

BUNT, ANN H., 1971, Research Associate in Ophthalmology; B.A., 1964, Texas; Ph.D., 1967, Texas Southwestern

BURGES, STEPHEN J.,\* 1970, Assistant Professor of Civil Engineering; B.S., B.E., 1967, University of Newcastle, New South Wales; M.S., 1968, Ph.D., 1970, Stanford

BURGESS, CHARLES 0.,\* 1964 (1970), Professor of Education; B.A., 1957, Oregon; M.S., 1958, Ph.D., 1962, Wisconsin

BURGESS, ROBERT L.,\* 1965 (1969), Associate Professor of Sociology; B.A., 1962, California State (Long Beach); M.A., 1964, Ph.D., 1969, Washington (St. Louis)

BURGNER, ROBERT LOUIS,\* 1956 (1967), Professor of Fisheries; Director, Fisheries Research Institute; B.S., 1942, Ph.D., 1958, Washington

BURKE, EVELYN A., 1943 (1970), Associate Professor Emeritus; B.S., 1930, Municipal University of Akron; Diploma in Nursing, 1930, M.A., 1941, Western Reserve; Certificate in Public Health Nursing, 1943, Washington

BURKE, JOHN PATRICK, 1970 (1974), Assistant Professor of Philosophy; B.A., 1965, California (Riverside); M.A., 1968, California (San Diego)

BURKE, ROBERT E.,\* 1957 (1965), Professor of History; A.B., 1946, Chico State; M.A., 1947, Ph.D., 1950, California

BURKE, WILLIAM T.,\* 1968, Professor of Law; B.S., 1949, Indiana State; J.D., 1953, Indiana; J.S.D., 1959, Yale BURNELL, JAMES M., 1950 (1971), Research Professor of Medicine; M.D., 1949, Stanford

BURNHAM, S. CAROLE, 1969 (1971), Instructor in Anesthesiology; B.Sc., 1961, M.D., 1965, British Columbia

BURNS, HARRY HAMILTON, 1934 (1970), Associate Professor Emeritus of English; A.B., 1928, Ph.D., 1935, Washington

BURNS, WAYNE,\* 1948 (1963), Professor of English; A.B., 1938, Miami (Ohio); A.M., 1940, Harvard; Ph.D., 1946, Cornell

BUSH, MARY T., 1971, Instructor in Psychosocial Nursing; B.S.N., 1968, Vermont; M.N., 1971, Washington

BUSINGER, JOOST A.,\* 1958 (1965), Professor of Atmospheric Sciences and Geophysics; B.S. (Candidaatsexamen), 1947, M.Sc. (Doctoraalexamen), 1950, Ph.D., 1954, Utrecht

BUTLER, JOHN, 1965, Professor of Medicine; M.B., 1946, Ch.B., 1946, M.D., 1957, Birmingham

BUTOW, ROBERT J. C.,\* 1960 (1966), Professor of History and East Asian Studies; A.B., 1947, A.M., 1948, Ph.D., 1953, Stanford

BUTWIN, JOSEPH MAZO, 1970 (1971), Assistant Professor of English; B.A., 1965, Minnesota; A.M., 1966, Ph.D., 1970, Harvard

BYERLY, ELIZABETH L.,\* 1962 (1970), Assistant Professor of Comparative Nursing Care Systems; Adjunct Assistant Professor of Anthropology; Assistant Dean of Clinical Teaching and Research Facilities; Diploma, 1947, Michael Reese Hospital; B.S.N., 1955, Iowa; M.N., 1958, Ph.D., 1970, Washington

BYERS, BRECK E.,\* 1970, Assistant Professor of Genetics; Adjunct Assistant Professor of Biochemistry; B.A., 1961, Colorado; M.A., 1963, Ph.D., 1967, Harvard

BYERS, MARGARET R., 1971, Research Associate in Anesthesiology; B.A., 1963, Radcliffe; Ph.D., 1969, Harvard

# С

CABANA, VENERACION, 1972 (1973), Research Associate in Medicine; B.S., 1964, Philippine Union College; M.S., 1972, Illinois

CADY, GEORGE HAMILTON, 1938 (1947), Professor Emeritus of Chemistry; A.B., 1927, A.M., 1928, Kansas; Ph.D., 1930, California

CAHN, ROBERT NATHAN, 1973, Research Assistant Professor of Physics; B.A., 1966, Harvard; Ph.D., 1972, California (Berkeley)

CALDWELL, LYNN R., 1971, Assistant Professor of Rehabilitation Medicine; A.B., 1957, Chaffey; B.A., 1959, San Francisco State; Ph.D., 1967, Arizona State

CALLEN, WILLIAM B., 1972, Research Associate in Health Services (MEDEX); B.M.E., 1952, Rensselaer Polytechnic Institute; A.M., 1960, St. Louis; S.T.B., M.A., 1969, St. Louis

CALVIN, WILLIAM H.,\* 1966 (1969), Assistant Professor of Neurological Surgery; B.A., 1961, Northwestern; Ph.D., 1966, Washington

CAMERMAN, ARTHUR, 1967 (1971), Research Assistant Professor of Medicine and Pharmacology; B.Sc., 1961; Ph.D., 1964, British Columbia

CAMPBELL, ERNEST H., 1950 (1964), Research Professor and Associate Director in Bureau of Governmental Research; A.B., 1932, LL.B., 1935, M.A., 1936, Washington; M.A., 1942, Ph.D., 1945, Harvard



CAMPBELL, FREDERICK L.,\* 1966 (1972), Associate Professor of Sociology; Adjunct Associate Professor of Nursing; B.S., 1961, Eastern Michigan; M.A., 1962, Ph.D., 1967, Michigan

CAMPBELL, JOHN A.,\* 1968, Assistant Professor of Speech; B.S., 1964, Portland State; M.A., 1967, Ph.D., 1968, Pittsburgh

CAMPBELL, M. JOE, 1972, Assistant Professor of Periodontics; B.S., 1963, Western Kentucky; D.M.D., 1967, Kentucky; M.S.D., 1972, Washington

CAMPBELL, MARY M., 1960 (1967), Lecturer in Pediatrics and Psychiatry and Behavioral Sciences; B.A., 1930, Manitoba; M.S., 1957, Ph.D., 1959, Washington

CAMPBELL, ROBERT J.,\* 1955, Assistant Professor of Ceramic Engineering; B.S. in Chem.E., 1939, Oregon State; M.S. in Cer.E., 1954, Washington

CANFIELD, ROBERT C.,\* 1951 (1970), Associate Professor of Restorative Dentistry; D.D.S., 1951, Washington

CANTRELL, JAMES R.,\* 1960, Professor of Surgery; B.A., 1944, M.D., 1946, Johns Hopkins

CARLIN, ALBERT S., 1964 (1969), Assistant Professor of Psychiatry and Behavioral Sciences; A.B., 1957, Pennsylvania; M.A., 1961, Ph.D., 1964, Syracuse

CARLSEN, JAMES C.,\* 1967 (1968), Professor of Music; B.A., 1950, Whitworth; M.A., 1958, Washington; Ph.D., 1962, Northwestern

CARLSEN, JAMES W., 1972, Assistant Professor of Speech; A.B., 1964, California; M.A., 1966, South Illinois; Ph.D., 1971, California (Los Angeles)

CARLSEN, RAY A., 1969 (1972), Assistant Professor of Medicine; B.A., 1957; M.D., 1962, Yale

CARLSON, COLDEVIN B., 1966 (1972), Associate Professor of Pediatrics; Adjunct Associate. Professor of Medicine; Head, Division of Pediatric Neurology; Co-Director, Neurology, Children's Orthopedic Hospital and Medical Center; B.A., 1955, Rice Institute; M.D., 1959, Baylor

CARLSON, DALE A.,\* 1955 (1967), Professor and Chairman of Civil Engineering; B.S. in C.E., 1950, M.S. in C.E., 1951, Washington; Ph.D., 1960, Wisconsin

CARLSON, F. PAUL,\* 1967 (1971), Associate Professor of Electrical Engineering; B.S. in E.E., 1960, Washington; M.S. in E.E., 1964, Maryland; Ph.D., 1967, Washington

CARNEVALI, DORIS L.,\* 1957 (1969), Associate Professor of Comparative Nursing Care Systems; Diploma, 1943, Swedish Hospital; B.S., 1947, M.N., 1961, Washington

CARPENTER, ROBERT L.,\* 1970, Assistant Professor of Speech; B.A., 1964, Augustana; M.A., 1965, Ph.D., 1969, Northwestern

CARPENTER, ROY,\* 1968 (1973), Associate Professor of Oceanography; B.S., 1961, Washington and Lee; Ph.D., 1968, California (San Diego)

CARR, JOHN E.,\* 1963 (1970), Associate Professor of Psychiatry and Behavioral Sciences and Psychology; A.B., 1956, Earlham; M.A., 1958, Ph.D., 1963, Syracuse

CARR, KENNETH M.,\* 1945 (1967), Associate Professor of Drama; B.A., 1943, Eastern Washington College of Education; M.A., 1945, Washington

CARRAHER, RONALD,\* 1967 (1970), Associate Professor of Art; B.A., 1956, Washington; M.A., 1961, San Jose State CARRELL, JAMES A.,\* 1939 (1947), Professor of Speech; A.B., 1927, Nebraska Wesleyan; M.A., 1929, Ph.D., 1936, Northwestern

CARSTENSEN, VERNON,\* 1964, Professor of History; B.A., 1928, Iowa State Teachers; M.A., 1932, Ph.D., 1936, State University of Iowa

CARTER, COLETTE C.,\* 1971, Assistant Professor of Urban Planning; B.A., 1963, Incarnate Word; M.A., 1967, Ph.C., Catholic University of America

CARTER, RICHARD FREMONT,\* 1967, Professor of Communications; B.S., 1953, M.S., 1954, Ph.D., 1957, Wisconsin

CASSINELLI, CHARLES W.,\* 1960 (1967), Professor of Political Science; A.B., 1948, M.A., 1950, California (Berkeley); Ph.D., 1953, Harvard

CASTEEL, RICHARD W., 1972, Assistant Professor of Anthropology; Adjunct Curator of Washington State Museum; A.B., 1969, Ph.D., 1972, California (Davis)

CAULFIELD, M. COLLEEN, 1973, Instructor in Maternal and Child Nursing; B.S.N., 1970, Seattle University; M.N., 1973, Washington

CELENTANO, FRANCIS,\* 1966 (1968), Associate Professor of Art; B.A., 1951, M.A., 1957, New York University

CHALK, WILLIAM S., 1961 (1967), Associate Professor of Mechanical Engineering and Nuclear Engineering; Associate Director, Nuclear Engineering Laboratory; B.S. in M.E., 1950, M.S. in M.E., 1961, Washington

CHALUPNIK, JAMES DVORAK,\* 1964 (1968), Associate Professor of Mechanical Engineering; B.S. in M.E., 1953, Texas Technological; M.S. in E.M., 1960, Ph.D., 1964, Texas

CHAMBERS, VELMA C., 1956 (1971), Research Associate Professor of Microbiology; R.N., 1937, Mercy Hospital, Denver; B.S., 1942, M.S., 1948, Ph.D., 1954, Washington

CHAMBLISS, IDA B., 1970, Lecturer in Social Work; B.S., 1958, Alabama State; M.S.W., 1967, Wisconsin (Milwaukee)

CHAMPOUX, JAMES J., 1972, Assistant Professor of Microbiology; B.S., 1965, Washington; Ph.D., 1970, Stanford

CHAN, HOK-LAM,\* 1972 (1974), Associate Professor of East Asian Studies, Institute for Comparative and Foreign Area Studies; B.A., 1961, M.A., 1963, University of Hong Kong; M.A., 1965, Ph.D., 1967, Princeton

CHAN, YUEN-KWOK,\* 1969, Assistant Professor of Mathematics; B.A., B.S., 1965, Hong Kong; M.A., 1968, Ph.D., 1969, California (San Diego)

CHANDLER, JOHN W., 1973, Assistant Professor of Ophthalmology; B.S., 1962, M.D., 1965, Wisconsin

CHANDLER, LYNETTE S., 1972; Instructor in Rehabilitation Medicine; B.S., 1961, Simmons; B.A., 1967, Washington

CHANDLER, TREVOR L.,\* 1970, Assistant Professor of Political Science; Director, Black Studies Program; B.S., 1966, California State Polytechnic; M.A., 1968, Ph.D., 1970, Oregon

CHANG, KUEI-SHENG,<sup>\*</sup> 1966 (1967), Associate Professor of Geography and East Asian Studies; B.A., 1945, National Central (Chungking); M.A., 1950, Ph.D., 1955, Michigan

CHAPMAN, C. RICHARD, 1971, Research Assistant Professor of Anesthesiology and Psychology; B.A., 1966, Wheaton (Illinois); M.A., 1968, Ph.D., 1969, Denver CHAPMAN, DOUGLAS GEORGE,\* 1949 (1971), Professor of Fisheries; Dean, College of Fisheries; B.A., 1938, Saskatchewan; M.A., 1940, California (Berkeley); M.A., 1944, Toronto; Ph.D., 1949, California (Berkeley)

CHAPMAN, WARREN H., 1957 (1973), Professor of Urology; Administrative Officer, Department of Urology; B.S., 1946, Massachusetts Institute of Technology; M.D., 1952, Chicago

CHAPPLE, STANLEY, 1958, Professor Emeritus of Music; D.Mus. (Hon.), 1947, Colby

CHARLSON, ROBERT J.,\* 1965 (1969), Associate Professor of Atmospheric Chemistry in Civil Engineering and Geophysics and Institute for Environmental Studies; Adjunct Associate Professor of Atmospheric Sciences and Astronomy; B.S., 1958, M.S., 1959, Stanford; Ph.D., 1964, Washington

CHEN, SHI-HAN, 1972, Research Assistant Professor of Pediatrics; B.S., 1959, Taiwan Normal University; M.S., 1963, National Taiwan University; Ph.D., 1968, Texas (Austin)

CHENEY, ERIC S.,\* 1964 (1969), Associate Professor of Geological Sciences; B.S., 1965, Ph.D., 1964, Yale

CHENEY, FREDERICK W., 1964 (1970), Associate Professor of Anesthesiology; Director, Pulmonary Therapy, University Hospital; B.S., 1956, M.D., 1960, Tufts

CHENOWETH, HARRY H.,\* 1946 (1957), Associate Professor of Civil Engineering; B.S. in C.E., 1937, M.S. in C.E., 1957, Washington

CHERVENAK, ROBERT, 1959 (1964), Associate Professor of Architecture; B.A., 1951, Washington

CHESNUT, CHARLES H. III, 1967 (1970), Instructor in Medicine; A.B., 1958, Princeton; M.D., 1966, Florida

CHEUNG, STEVEN N. S.,\* 1969 (1973), Professor of Economics; A.B., 1961, M.A., 1962, Ph.D., 1967, California (Los Angeles)

CHEW, KENNETH KENDALL,\* 1962 (1971), Professor of Fisheries; B.A., 1955, Chico State; M.S., 1958, Ph.D., 1962, Washington

CHI, EMIL Y., 1972 (1973), Research Associate in Pathology; Director, Histopathology Laboratory; B.S., 1964, Taiwan; M.A., 1967, Los Angeles State; Ph.D., 1972, California

CHILDS, MARIAN TOLBERT, 1968 (1973), Assistant Professor of Home Economics; B.S., 1946, Ph.D., 1950, California (Berkeley)

CHILDS, MORRIS ELSMERE,\* 1954 (1961), Professor and Chairman of Mechanical Engineering; B.S. in M.E., 1944, Oklahoma; M.S. in M.E., 1947, Ph.D., 1956, Illinois

CHILES, JOHN A., 1973, Assistant Professor of Psychiatry and Behavioral Sciences; B.S., 1962, Davidson; M.D., 1966, Pennsylvania

CHILTON, MARY-DELL M., 1972, Research Assistant Professor of Microbiology; B.S., 1960, Ph.D., 1967, Illinois

CHILTON, WILLIAM SCOTT,\* 1963 (1968), Associate Professor of Chemistry; B.S., 1955, Duke; Ph.D., 1963, Illinois

CHIMOSKEY, JOHN E., 1971, Assistant Professor of Bioengineering; M.D., 1963, Michigan

CHIN, MAE MAR, 1971, Instructor in Dental Hygiene; B.S., 1963, R.D.H., 1963, Washington

CHISUM, DONALD S.,\* 1969 (1972), Associate Professor of Law; A.B., 1966, LL.B., 1968, Stanford

CHITTOCK, ROBERT W., 1973, Lecturer in Landscape Architecture; B.L.A., 1955, Oregon CHIU, JOHN S. Y.,\* 1960 (1968), Professor of Quantitative Methods; B.A., 1952, National Taiwan University; M.S., 1955, Kentucky; Ph.D., 1954, Illinois

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CHRISMAN, NOEL J., 1973, Assistant Professor of Comparative Nursing Care Systems; A.B., 1962, California (Riverside); Ph.D., 1966, M.P.H., 1967, California (Berkeley)

CHRISTENSEN, GERALD, 1964 (1969), Associate Professor of Radiology; Ph.D., 1958, Emory; B.S., 1951, Utah

CHRISTENSEN, NIKOLAS 1.,\* 1966 (1972), Professor of Geological Sciences and Geophysics; B.S., 1959, M.S., 1961, Ph.D., 1963, Wisconsin

CHRISTIAN, GARY DALE,\* 1972, Professor of Chemistry; B.S., 1959, Oregon; M.S., 1962, Ph.D., 1964, Maryland

CHRISTIANSEN, WALTER H.,\* 1967 (1970), Associate Professor of Aeronautics and Astronautics; B.S.M.E., 1956, Cannegie Institute of Technology; M.S.A.E., 1957, Ph.D., 1961, California Institute of Technology

CHRISTOFIDES, CONSTANTINE G.,\* 1966, Professor of French Language and Literature and Comparative Literature; B.A., 1948, Columbia Union; M.A., 1949, M.A., 1950, Ph.D., 1956, Michigan

CHRISTOPHER, T. GRAHAM, 1968 (1972), Assistant Professor of Medicine; 'M.B., B.S., 1956, Middlesex Hospital Medical School; M.S., 1968, Drexel Institute of Technology

CHURCH, PHIL E., 1935 (1972), Professor Emeritus of Atmospheric Sciences; B.S., 1923, Chicago; M.S., 1932, Ph.D., 1937, Clark

CIRTAUTAS, ILSE D.,\* 1968, Associate Professor of Turkic, Inner Asian Studies, and Russian and East European Studies; Ph.D., 1958, Hamburg

CLAGETT, JAMES A., 1973, Research Ássistant Professor of Periodontics and Microbiology; B.A., 1964, DePauw; M.S., 1966, Ph.D., 1970, Nebraska

CLANTON, JACK R.,\* 1947 (1958), Professor of Civil Engineering; B.S. in C.E., 1936; Missouri School of Mines; M.S. in C.E., 1939, Pittsburgh

CLARK, D. CECIL,\* 1965 (1973), Professor of Education; B.S., 1960, M.S., 1961, Brigham Young; Ph.D., 1965, Stanford

CLARK, D. JOSEPH, 1971 (1973), Assistant Professor of Biology Instructional Program; B.S., 1958, M.S., 1959, Washington State; Ph.D., 1963, California (Davis)

CLARK, HUGH, 1968 (1973), Associate Professor of Medicine; B.A., 1957, Williams; M.D., 1961, Columbia

CLARK, KENNETH COURTRIGHT,\* 1948 (1960), Professor of Physics and Geophysics; B.A., 1940, Texas; M.A., 1941, Ph.D., 1947, Harvard

CLARK, LARRY T., 1973, Research Assistant Professor of Mechanical Engineering; B.S. in M.E., 1961, M.S. in M.E., 1963, Ph.D., 1973, Washington

CLARK, ROBERT A., 1967 (1973), Assistant Professor of Medicine; A.B., 1963; Syracuse; M.D., 1967, Columbia

CLARK, ROBERT N.,\* 1957 (1966), Professor of Electrical Engineering; B.S. in E.E., 1950, M.S. in E.E., 1951, Michigan; Ph.D., 1969, Stanford

CLARKE, HENRY LELAND,\* 1958 (1959), Associate Professor of Music; A.B., 1928, A.M., 1929, Ph.D., 1947, Harvard CLATTERBAUGH, KENNETH C.,\* 1966 (1973), Associate Professor of Philosophy; B.A., 1962, Iowa; Ph.D., 1967, Indiana

CLAWSON, D. KAY, 1958 (1965), Professor and Chairman of Orthopaedics; M.D., 1952, Harvard

CLAYSON, KATHLEEN J., 1969, Assistant Professor of Laboratory Medicine; B.S., 1951, M.S., 1968, Minnesota

CLAYTON, EUGENE D., 1965, Research Associate Professor of Nuclear Engineering; B.A., 1947, Whitman; M.S., 1949, Ph.D., 1952, Oregon

CLEAR, JOHN W.,\* 1969 (1971), Assistant Professor of Near Eastern Languages and Literature (Hebrew and Ancient Near East) and Near Eastern Studies; B.A., 1963, Saskatchewan; M.A., 1965, Ph.D., 1969, Toronto

CLELAND, ROBERT E.,\* 1964 (1968), Professor of Botany; A.B., 1953, Oberlin; Ph.D., 1957, California Institute of Technology

CLEMENS, LOIS GERARD, 1960, Lecturer in English; A.B., 1935, Nebraska; M.A., 1956, Washington

CLONEY, RICHARD A.,\* 1961 (1972), Professor of Zoology; A.B., 1951, M.A., 1954, Humboldt; Ph.D., 1959, Washington

CLOWERS, MICHAEL, 1972, Instructor in Rehabilitation Medicine; B.A., 1966, M.A., 1969, Ph.D., 1972, Southern Illinois

COACHMAN, LAWRENCE K.,\* 1962 (1972), Professor of Oceanography; A.B., 1948, Dartmouth; M.For., 1951, Yale; Ph.D., 1962, Washington

COATES, PENELOPE W.,\* 1971, Assistant Professor of Biological Structure; B.S., 1955, St. Lawrence; M.M.A., 1957, Ph.D., 1969, Texas

COATS, HERBERT S.,\* 1968 (1970), Assistant Professor of Slavic Linguistics and Russian and East European Studies; B.A., 1959, Colorado; M.A., 1964, Fordham; Ph.D., 1970, Illinois

COBB, LEONARD A., 1957 (1971), Professor of Medicine'; B.S., 1949, M.D., 1952, Minnesota

COBB, MARGUERITE, \* 1953 (1966), Associate Professor and Chairman of Family and Community Nursing; B.S., 1949, M.N., 1957, Washington

COBURN, ROBERT C.,\* 1971, Professor of Philosophy; B.A., 1951, Yale; B.D., 1954, Chicago; M.A., Ph.D., 1958, Harvard

COCHRAN, LYALL BAKER, 1934 (1969), Professor Emeritus of Electrical Engineering; B.S. in E.E., 1923, E.E., 1936, Washington

COHEN, JOSEPH,\* 1932 (1969), Associate Professor of Sociology; B.A., 1925, M.A., 1927, Washington; Ph.D., 1936, Michigan

COHEN, M. MICHAEL, 1971, Research Assistant Professor of Orthodontics; A.B., 1965, Michigan; D.M.D., 1966, Tufts; M.S.D., 1969, M.S., 1970, Ph.D., 1971, Minnesota

COHEN, S. MARC,\* 1973, Associate Professor of Philosophy; B.A., 1962, Brandeis; Ph.D., 1967, Cornell

COLCORD, JOSIAH E., JR.,\* 1949 (1968), Professor of Civil Engineering; B.S., 1947, Maine; M.S. in C.E., 1949, Minnesota

COLDEWEY, JOHN CHRISTOPHER, 1972 (1973), Assistant Professor of English; B.A., 1966, Lewis; M.A., 1969, Northern Illinois; Ph.D., 1973, Colorado

COLE, DALE WARREN,\* 1964 (1968), Associate Professor of Forest Soils; Director, Center for Ecosystem Studies; B.S.F., 1955, Washington; M.S., 1957, Wisconsin; Ph.D., 1963, Washington COLE, JAMES J., 1960 (1968), Research Associate in Medicine; B.S., 1964, Idaho

COLE, KENNETH C., 1924 (1967), Professor Emeritus of Political Science; B.Lit. in Law, 1924, Oxford; Ph.D., 1930, Harvard

COLE, WILLIAM M., 1971, Instructor in Family Medicine; B.A., 1960, Randolph Macon; M.D., 1965, Virginia

COLLAR, BERNICE S., 1969, Instructor in Maternal and Child Nursing; B.S., 1958, M.Ed., 1968, Seattle University

COLLINS, JAMES D., 1958, Assistant Professor of Mechanical Engineering; B.S. in M.E., 1938, Michigan State; M.S. in I.E., 1958, Purdue

COLLINS, JANE A. H., 1969 (1971), Research Instructor in Pharmacology; B.S., 1966, M.S., 1968, Washington

CONLON, FRANK F.,\* 1968 (1969), Assistant Professor of History and South Asian Studies; B.A., 1960, Northwestern; M.A., 1963, Ph.D., 1969, Minnesota

CONRAD, JOHN T.,\* 1962 (1967), Associate Professor of Physiology and Biophysics and Obstetrics and Gynecology; B.A., 1951, M.S., 1955, Ph.D., 1961, New York

CONRAD, SUZANNE H., 1962, Research Assistant Professor of Obstetrics and Gynecology; B.A., 1951, Skidmore; M.D., 1956, New York

CONROY, PATRICIA LEE, 1972, Acting Assistant Professor of Scandinavian Languages and Literature; B.A., 1963, Rutgers; M.A., 1968, California (Berkeley)

CONTRERAS, HELES,\* 1964 (1967), Associate Professor of Linguistics and Romance Languages and Literature; M.A., 1959, Ph.D., 1961, Indiana

CONWAY, JOHN A.,\* 1928 (1950), Professor of Drama; B.A., 1927, Carnegie Institute of Technology

COOK, JAMES D., 1968 (1973), Associate Professor of Medicine; M.D., C.M., 1960, Queens

COOK, JANET L., 1972, Instructor in Maternal and Child Nursing; B.N., 1969, Manitoba; M.N., 1972, Washington

COOK, KAREN S., 1972 (1973), Assistant Professor of Sociology; B.A., 1968, M.A., 1970, Ph.D., 1973, Stanford

COOK, VICTOR,\* 1963 (1967), Associate Professor of Physics; A.B., 1956, Ph.D., 1962, California (Berkeley)

COOKE, JOSEPH R.,\* 1967 (1969), Associate Professor of Thai; Adjunct Associate Professor of Linguistics; B.A., 1952, Biola; B.A., 1961, Ph.D., 1965, California (Berkeley)

COOMBS, HOWARD A.,\* 1934 (1949), Professor of Geological Sciences; Adjunct Professor of Geophysics; Adjunct Curator of Washington State Museum; B.S., 1929, M.S., 1932, Ph.D., 1935, Washington

COONEY, MARION K.,\* 1965 (1972), Associate Professor of Pathobiology; B.A., 1939, St. Benedict (Minnesota); M.S., 1953, Ph.D., 1962, Minnesota

COOPER, ELNETA A., 1972 (1973), Associate Professor of Music; B.S., 1957, M.Ed., 1959, Wayne State; D.Ed., 1971, Oregon

COPE, ROBERT G.,\* 1969, Assistant Professor of Education; B.A., 1959, A.M., 1961, Ph.D., 1967, Michigan

COPELAND, LEE GORDON,\* 1964 (1973), Professor of Architecture; Dean, College of Architecture and Urban Planning; B.Arch., 1960, Washington; M.Arch., 1963, M.C.P., 1963, Pennsylvania



CORBALLY, JOHN EDWARD, 1927 (1967), Professor Emeritus of Education; B.A., 1918, Whitworth; M.A., 1925, Ph.D., 1929, Washington

CORKER, CHARLES E.,\* 1965, Professor of Law, A.B., 1941, Stanford; LL.B., 1946, Harvard

CORLETT, RICHARD COLLISTER,\* 1964 (1968), Associate Professor of Mechanical Engineering; B.S., 1949, M.M.E., 1953, Rensselaer Polytechnic Institute; Ph.D., 1963, Harvard

CORSON, HARRY HERBERT,\* 1958 (1965), Professor of Mathematics; A.B., 1952, Vanderbilt; M.S., 1954, Ph.D., 1957, Duke

CORZATTE, CLAYTON, 1969 (1971), Lecturer in Drama; B.A., 1951, Alabama

COSTIGAN, GIOVANNI,\* 1934 (1948), Professor of History; B.A., 1926, B.Litt., 1930, M.A., 1930, Oxford; M.A., 1928, Ph.D., 1930, Wisconsin

COSTNER, HERBERT L.,\* 1959 (1970), Professor and Chairman of Sociology; B.A., 1953, Oklahoma; M.A., 1956, Ph.D., 1960, Indiana

COSWAY, RICHARD,\* 1958, Professor of Law; A.B., 1939, Denison; J.D., 1942, Cincinnati

COTTRELL, WILLIAM F., 1967, Lecturer in Civil Engineering; B.S. in I.E., 1958, B.S. in C.E., 1961, Seattle

COUNTS, RICHARD B., 1967 (1973), Assistant Professor of Medicine; A.B., 1963; M.D., 1967, Washington (St. Louis)

COUNTS, SANDRA JO, 1972, Instructor in Pediatrics; B.S., 1963, Texas; M.D., 1967, Washington

COWAN, DIANA M., 1969 (1973), Assistant Professor of Maternal and Child Nursing; B.A., 1963, B.S.N., 1964, Kansas; M.N., 1969, Washington

COX, GARY B., 1972, Instructor in Psychiatry and Behavioral Sciences; B.S., 1962, Oregon; Ph.D., 1970, Duke

COX, GERARD H. III,\* 1966, Assistant Professor of English; B.A., 1960, Washington; Ph.D., 1968. Stanford

COX, JUDITH B., 1966 (1970), Lecturer in Economics; B.A., 1962, Northwestern; M.A., 1965, Stanford

COYLE, MARIE B., 1973, Assistant Professor of Laboratory Medicine and Microbiology; B.A., 1957, Mundelin; M.S., 1963, St. Louis; Ph.D., 1965, Kansas State

CRAIN, RICHARD WILLSON, SR.,\* 1936 (1953), Associate Professor of Mechanical Engineering; B.S. in E.E., 1930, B.S. in M.E., 1932, Colorado State; M.S. in M.E., 1946, Washington

CRAMER, DOROTHY I., 1961, Lecturer in Microbiology; B.S., 1945, Washington

CRAMER, JOHN G.,\* 1964 (1967), Associate Professor of Physics; B.A., 1957, M.A., 1959, Ph.D., 1961, Rice

CRANSTON, PATRICIA,\* 1954 (1963), Associate Professor of Communications; B.J., 1944, M.J., 1954, Texas

CRAVEN, RUTH F., 1968 (1972), Assistant Professor of Physiological Nursing; B.S.N., 1967, Kansas; M.N., 1968, Washington

CREAGER, JOE SCOTT,\* 1958 (1966), Professor of Oceanography; Associate Dean, College of Arts and Sciences; B.S., 1951, Colorado College; M.S., 1953, Ph.D., 1958, Texas A&M

CREORE, ALVIN EMERSON,\* 1940 (1953), Associate Professor of French Language and Literature; A.B., 1934, M.A., 1936, Rochester; Ph.D., 1939, Johns Hopkins CRIDER, JAMES R.,\* 1952 (1972), Professor of Drama; Acting Executive Director, School of Drama; B.A., 1945, Cornell; M.A., 1950, Washington

CRILL, WAYNE E.,\* 1967 (1972), Associate Professor of Physiology and Biophysics and Medicine; B.S., 1956, College of Idaho; M.D., 1962, Washington

CRIMINALE, WILLIAM O.,\* 1968 (1973), Professor of Oceanography and Geophysics; B.S., 1955, Alabama; Ph.D., 1960, Johns Hopkins

CRITTENDEN, ALDEN L.,\* 1947 (1960), Associate Professor of Chemistry; B.S., 1942, Ph.D., 1947, Illinois

CROCKER, J. LAWRENCE,\* 1970 (1971), Assistant Professor of Philosophy; A.B., 1966, Yale; A.M., 1968, Ph.D., 1970, Harvard

CROSS, HARRY M.,\* 1943 (1949), Professor of Law; B.A., 1936, Washington State; J.D., 1940, Washington

CROSSON, ROBERT S.,\* 1966 (1972), Associate Professor of Geophysics; Adjunct Associate Professor of Geological Sciences; B.S., 1961, Washington; M.S., 1963, Utah; Ph.D., 1966, Stanford

CROWELL, LAURA IRENE, 1949 (1973), Professor Emeritus of Speech; B.A., 1929, South Dakota; M.A., 1940, Ph.D., 1948, Iowa

CROWLEY, DOROTHY M.,\* 1965, Associate Professor of Physiological Nursing; Associate Dean and Director of Graduate Programs; Diploma, 1941, McKennan School of Nursing; B.S., 1950, St. Louis; M.N., 1953, Ph.D., 1961, Catholic University of America

CRUTCHFIELD, JAMES A.,\* 1949 (1963), Professor of Economics, Public Affairs, and African Studies; Adjunct Professor of Environmental Studies and Marine Studies; A.B., 1940, M.A., 1942, California (Los Angeles); Ph.D., 1954, California (Berkeley)

CUENE, SARA ANN, 1972, Instructor in Pediatrics; B.A., 1965, M.D., 1969, Wisconsin

CULBERT, GARY A., 1972, Acting Assistant Professor of English; B.A., 1966, St. Olaf; M.A., 1967, Chicago

CULBERT, SIDNEY S.,\* 1947 (1961), Associate Professor of Psychology; B.A., 1943, Ph.D., 1950, Washington

CULLEN, BRUCE F., 1972, Assistant Professor of Anesthesiology; B.S., 1962, Stanford; M.D., 1966, California (Los Angeles)

CULLEN, THOMAS J., 1969 (1971), Research Associate in Medicine; B.A., 1959, National University of Ireland; M.Ed., 1970, Ph.D., 1972, Washington

CÚRJEL, CASPAR R.,\* 1964 (1969), Professor of Mathematics; Diploma, 1954, Dr.Sc.Math., 1960, Eidg. Techn. Hochschule, Zurich (Switzerland)

CURTIS, EDWARD BALDWIN,\* 1970 (1972), Professor of Mathematics; A.B., 1954, M.A., Ph.D., 1962, Harvard

CURTIS, F. KINGSBURY, 1965 (1967), Assistant Professor of Medicine; B.S., 1952, Yale; M.D., 1956, Columbia

CURTIS, J. WILLIAM,\* 1962 (1969), Associate Professor of Architecture; B.Arch., 1952, M.A., 1969, Washington

CURTIS-VERNA, MARY,\* 1969, Professor of Music; A.B., 1943, Hollins

CUTLER, RALPH E., 1963 (1969), Associate Professor of Medicine; Director, Clinical Research Center, Harborview Medical Center; M.D., 1956, California (Los Angeles) D

DAHLSTROM, ROBERT A.,\* 1971 (1972), Assistant Professor of Drama; B.A., 1960, Wheaton; M.A., 1967, Illinois

DAHN, RICHARD,\* 1965 (1967), Associate Professor of Art; B.F.A., 1954, Miami (Ohio); M.F.A., 1959, Yale

DAILEY, MICHAEL,\* 1963 (1969), Associate Professor of Ari; B.A., 1960, M.F.A., 1963, State University of Iowa

DALE, BEVERLY, 1972, Research Assistant Professor of Periodontics; B.S., 1964, Ph.D., 1968, Michigan

DALE, PHILIP S.,\* 1968, Assistant Professor of Psychology; Adjunct Assistant Professor of Linguistics; B.S., 1963, Chicago; M.S., 1964, 1966, Ph.D., 1968, Michigan

DALE, ROBERT C.,\* 1963 (1967), Associate Professor of French Language and Literature; B.A., 1958, M.A., 1960, Ph.D., 1963, Wisconsin

DALY, COLIN HENRY,\* 1967 (1972), Associate Professor of Mechanical Engineering; B.Sc., 1963, Ph.D., 1966, Glasgow

DAMBORG, MARK J.,\* 1969, Assistant Professor of Electrical Engineering; B.S., 1962, Iowa State; M.S.E., 1963, Ph.D., 1969, Michigan

D'AMBROSIO, CHARLES A.,\* 1960 (1970), Professor of Finance; B.S.C., 1955, Loyola; M.S., 1958, Ph.D., 1962, Illinois

D'ANGELO, GARY A.,\* 1970, Assistant Professor of Speech; A.B., 1961, M.A., 1962, Nebraska; Ph.D., 1970, Colorado

DANIELS, MARIE C., 1973, Acting Assistant Professor of Spanish Language and Literature; B.A., 1967, Wisconsin

D'ANNA, JAMES A., 1970 (1972), Instructor in Orthodontics; D.D.S., 1965, Emory

DASH, JAY GREGORY,\* 1960 (1963), Professor of Physics; B.S., 1944, City College, New York; M.A., Ph.D., 1951, Columbia

DAVID, JEAN FERDINAND,\* 1936 (1968), Professor Emeritus of French Language and Literature; B.A., 1923, Sorbonne; M.A., 1932, Saskatchewan; Ph.D., 1936, Johns Hopkins; Docteur, 1962, Université de Paris

DAVID, MORTON M.,\* 1953 (1962), Professor of Chemical Engineering; B.S.Ch.E., 1942, Colorado; D.Eng., 1950, Yale

DAVIDSON, ERNEST R.,\* 1962 (1968), Professor of Chemistry; B.S., 1958, Rose Polytechnic Institute; Ph.D., 1961, Indiana

DAVIDSON, ROBERT C., 1965 (1969), Assistant Professor of Medicine; Associate Director, WAMI; M.D., 1953, Washington

DAVIE, EARL W.,\* 1962 (1966), Professor of Biochemistry; B.S., 1950, Ph.D., 1954, Washington

DAVIS, ALANSON BEWICK, 1947 (1965), Associate Professor Emeritus of Drama; A.B., 1947, Washington

DAVIS, JOHN M., 1967 (1972), Associate Professor of Pedodontics; D.D.S., 1961, M.S.D., 1967, Washington

DAVIS, PAUL W.,\* 1967, Assistant Professor of Pharmacology; B.S., 1961, Kansas; Ph.D., 1966, Michigan

DAVIS, STARKEY D., 1962 (1973), Professor of Pediatrics; B.A., 1953, M.D., 1957, Baylor

DAY, EMMETT ELBERT,\* 1947 (1954), Professor of Mechanical Engineering; B.A., 1936, B.S., 1945, M.S., 1946, Massachusetts Institute of Technology DAY, ROBERT W.,\* 1968 (1972), Professor of Health Services; Dean, School of Public Health and Community Medicine; M.D., 1956, Chicago; M.P.H., 1958, Ph.D., 1962, California

DEAR, RONALD B.,\* 1970, Associate Professor of Social Work; B.A., 1955, Bucknell; M.S.W., 1957, Pittsburgh; D.S.W., 1972, Columbia

DECHER, REINER,\* 1967 (1973), Associate Professor of Aeronautics and Astronautics; on leave; B.Aero.Eng., 1961, Rensselaer Polytechnic Institute; S.M., 1962, Ph.D., 1967, Massachusetts Institute of Technology

**DECOSTER, DON T.**,\* 1961 (1970), Professor of Accounting; B.B.A., 1954, West Texas State; M.B.A., 1958, Ph.D., 1961, Texas; C.P.A., 1957, State of Texas

DEHMELT, HANS GEORG,\* 1955 (1961), Professor of Physics; B.S., 1946, M.S., 1949, Ph.D., 1950, Goettingen

DEISHER, ROBERT W., 1949 (1962), Professor of Pediatrics; Director, Clinical Training Unit; Associate Director, Child Development and Mental Retardation Center; B.A., 1941, Knox; M.D., 1944, Washington

DE JONG, RUDOLPH H.,\* 1965 (1969), Professor of Anesthesiology and Pharmacology; B.S., 1951, M.D., 1954, Stanford

DEKKER, DAVID BLISS,\* 1948 (1959), Associate Professor of Mathematics and Computer Science; A.B., 1941, California (Berkeley); M.S., 1943, Illinois Institute of Technology; Ph.D., 1948, California (Berkeley)

DELACY, ALLAN CLARK,\* 1946 (1958), Professor of Fisheries; B.S., 1932, M.S., 1933, Ph.D., 1941, Washington

DELATEUR, BARBARA J.,\* 1967 (1971), Associate Professor of Rehabilitation Medicine; B.S., 1959, St. Louis; M.D., 1963, M.S., 1968, Washington

DEL MORAL, ROGER,\* 1968, Assistant Professor of Botany; B.A., 1965, M.A., 1966, Ph.D., 1968, California (Santa Barbara)

DEMPSTER, STUART, 1968, Assistant Professor of Music; B.A., 1958, M.A., 1967, San Francisco State

DENMAN, FREDERICK L.,\* 1961 (1967), Associate Professor of Marketing; B.S., 1951, United States Military Academy; Ph.D., 1964, California (Berkeley)

DENNIS, MELVIN B., JR., 1971, Research Associate in Medicine; B.S., D.V.M., 1961, Washington State

DENNY, BREWSTER C.,\* 1961 (1964), Professor of Public Affairs; Dean, Graduate School of Public Affairs; A.B., 1945, Washington; M.A., 1948, Ph.D., 1959, Fletcher School of Law and Diplomacy

DENSMORE, HARVEY BRUCE, 1907 (1952), Professor Emeritus of Classics; Research Consultant; A.B., 1903, Oregon; A.B., 1907, Oxford

DENTON, ALICE C., 1973, Instructor in Psychosocial Nursing; B.S., 1970, M.A., 1973, Washington

DENTON, MELINDA F.,\* 1972, Assistant Professor of Botany; Curator of the Herbarium; B.S., 1965, Kansas State; M.A., 1967, Ph.D., 1971, Michigan

DEPEW, CREIGHTON ARTHUR,\* 1960 (1972), Professor of Mechanical Engineering; B.S. in M.E., 1956, M.S. in M.E., 1957, Ph.D., 1960, California (Berkeley)

DERANLEAU, DAVID A.,\* 1969, Assistant Professor of Biochemistry; B.A., 1956, San Francisco State; M.S., 1958, Stanford; Ph.D., 1963, Washington DERR, MARY ANN, 1971, Associate in Pathology; B.S., 1954, Holy Names (Spokane)

DERVIN, BRENDA, L.,\* 1972, Assistant Professor of Communications; B.S., 1960, Cornell; M.A., 1968, Ph.D., 1971, Michigan State

DER YUEN, DOUGLAS, 1972, Instructor in Obstetrics and Gynecology; B.A., 1960, Pomona; M.D., 1964, California (San Francisco)

DETTER, JAMES C., 1969 (1971), Assistant Professor of Laboratory Medicine; Head, Division of Genetics; Director, Hematology Laboratory, Harborview Medical Center; B.S., 1955, M.D., 1962, Kansas

DE VITO, JUNE L., 1963 (1965), Research Assistant Professor of Neurological Surgery; B.A., 1947, M.A., 1949, British Columbia; Ph.D., 1954, Washington

DE WERD, LARRY A., 1970 (1972), Research Assistant Professor of Metallurgical Engineering; B.S. in Physics and Mathematics, 1963, M.S. in Physics, 1965, Ph.D. (Physics), 1970, Wisconsin

DEYRUP-OLSEN, INGRITH J.,\* 1964 (1969), Professor of Zoology; A.B., 1940, Barnard; Ph.D., 1944, Columbia

DIEHR, GEORGE,\* 1968, Assistant Professor of Quantitative Methods; B.S., 1963, Harvey Mudd; M.B.A., 1966, Ph.D., 1969, California (Los Angeles)

DIEHR, PAULA,\* 1970 (1972), Assistant Professor of Biostatistics; B.S., 1963; Harvey Mudd; M.S., 1967, Ph.D., 1970, California (Los Angeles)

DIETRICHSON, PAUL,\* 1955 (1968), Professor of Philosophy; A.B., 1947, Georgia; Ph.D., 1955, Yale

DIETZ, ROBERT E.,\* 1947 (1958), Professor of Architecture; B:Arch., 1941, Washington; M.A., 1944, Massachusetts Institute of Technology; Ph.D. in Science, 1967, Nebraska

DILL, ELLIS HAROLD,\* 1956 (1964), Professor of Aeronautics and Astronautics; B.S. in C.E., 1954, M.S. in C.E., 1955, Ph.D. in C.E., 1957, California

DILLARD, DAVID H.,\* 1954 (1969), Professor of Surgery; A.B., 1946, Whitman; M.D., 1950, Johns Hopkins

DILLE, JAMES M.,\* 1936 (1940), Professor of Pharmacology; B.S., 1930, M.S., 1933, Nebraska; Ph.D., 1935, Georgetown; M.D., 1946, Illinois

DILLINGHAM, LLOYD A., 1964 (1972), Research Associate in Medicine; D.V.M., 1964, Washington State

DIMMITT, NORMA M.,\* 1969 (1970), Assistant Professor of Education; B.A., 1959, M.Ed., 1963, Washington; Ed.D., 1970, Stanford

DIMOND, RICHARD A., 1969 (1973), Instructor in Orthopaedics; M.D., 1966, Iowa

DISBROW, MILDRED A.,\* 1968 (1972), Professor of Maternal and Child Nursing; Diploma, 1940, Allegheny General Hospital; Diploma, 1948, Margaret Hague Maternity Hospital; B.S., 1952, M.L., 1954, Pittsburgh; Ph.D., 1968, Washington

DISCHER, DAVID P.,\* 1970, Associate Professor of Environmental Health; Director, Department of Environmental Health and Safety; B.S., 1955, Notre Dame; M.D., 1959, Illinois

DIXON, AGNES E., 1966, Lecturer in Social Work; Assistant Director of Admissions; B.A., 1951, Notre-Dame (Saskatchewan); B.S.W., 1957, M.S.W., 1958, Ottawa

DOBIE, EDITH, 1926 (1957), Professor Emeritus of History; B.A., 1914, Syracuse; A.M., 1938, Columbia; Ph.D., 1942, Johns Hopkins DODD, MARYLIN J., 1973. Instructor in Physiological Nursing; Diploma, 1967, Vancouver (British Columbia) General Hospital; B.S., 1971, M.N., 1973, Washington

DODD, STUART C., 1947, Professor Emeritus of Sociology; B.S., 1922, M.A., 1924, Ph.D., 1926, Princeton

DODGE, HAROLD T., 1969, Professor of Medicine; M.D., 1948, Harvard

DOERMANN, AUGUST H.,\* 1964, Professor of Genetics; A.B., 1940, Wabash; M.A., 1941, Illinois; Ph.D., 1946, Stanford

DOERR, HANS O.,\* 1967 (1971), Associate Professor of Psychiatry and Behavioral Sciences and Psychology; B.A., 1961, M.S., 1962, Ph.D., 1965, Florida State

DOGGETT, RICHARD G., 1972, Assistant Professor of Aerospace Studies; B.G.E., 1960, Omaha; M.A.O.M., 1967, Southern California

DOHNER, CHARLES W., 1967 (1969), Assistant Professor of Medicine and Education; Director of Research in Medical Education; B.S., 1950, B.Ed., 1951, Seattle Pacific; M.S., 1957, Kansas State; Ph.D., 1966, Ohio State

DOLBEARE, KENNETH M.,\* 1970, Professor of Political Science; B.A., 1951, Haverford; Ph.D., 1965, Columbia

DOMOTO, PETER K., 1969 (1973), Instructor in Pedodontics; D.D.S., 1964, California (San Francisco)

DONAHUE, ROGER P., 1969 (1972), Research Associate Professor of Medicine and Obstetrics and Gynecology; B.A., 1957, Ph.D., 1968, Johns Hopkins

DONALDSON, JAMES A., 1965, Professor and Chairman, Department of Otolaryngology; B.A., 1950, B.S., 1952, M.D., 1954, Minnesota

DONALDSON, LAUREN RUSSELL, 1932 (1973), Professor Emeritus of Fisheries; consultant, 1973; A.B., 1926, Intermountain Union; M.S., 1931, Ph.D., 1939, Washington

DONALDSON, SUE K., 1967 (1973), Assistant Professor of Physiological Nursing and Physiology and Biophysics; B.S.N., 1965, M.S.N., 1966, Wayne State; Ph.D., 1973, Washington

DONNETTE, JAMES, 1966 (1969), Assistant Professor of Architecture; A.A., 1958, El Camino; B.Arch., 1963, California (Berkeley); M.A., 1969, Washington

DONOHUE, LAWRENCE R., 1971, Assistant Professor of Obstetrics and Gynecology; B.S., 1960, Seattle University; M.D., 1964, Marquette

DONOVAN, WILLIAM, 1972, Instructor in Rehabilitation Medicine; B.S., 1962, Manhattan; M.D., 1966, Albany Medical College

DOOLITTLE, THEUS LEE,\* 1970, Associate Professor of Physical Education; B.S., 1954, M.S., 1955, California (Los Angeles); Ph.D., 1963, Southern California

DORSEY, ALAN JAY, 1973, Lecturer in Music; B.A., B.M., 1971, Washington; M.A., 1973, Pennsylvania

DOUGLAS, DONALD G.,\* 1968, Assistant Professor of Speech; B.A., 1959, Pacific Lutheran; M.S., 1960, Oregon; Ph.D., 1965, Oklahoma

DOUGLAS, HOWARD C.,\* 1941 (1958), Professor of Microbiology and Genetics; A.B., 1936, Ph.D., 1949, California (Berkeley)

DOUGLAS, ROBERT J.,\* 1968, Associate Professor of Psychology; A.B., 1959, M.A., 1961, Ph.D., 1964, Michigan

DOUTHWAITE, GEOFFREY K., 1961 (1969), Associate Professor of Humanistic-Social



Studies; B.S. in E.E., 1952, M.S. in E.E., 1963, Washington

DOW, DANIEL GOULD,\* 1968, Professor of Electrical Engineering; Chairman, Department of Electrical Engineering; B.S., 1952, M.S. in E.E., 1953, Michigan; Ph.D., 1958, Stanford

DOWDLE, BARNEY,\* 1962 (1966), Associate Professor of Economics and Forest Economics; B.S.F., 1957, Washington; M.F., 1958, Ph.D., 1962, Yale

DRALLE, ALAN JEROME, 1972, Instructor in Rehabilitation Medicine; B.S., 1968, Washington

DRENNAN, G. ALEX, 1962 (1964), Assistant Professor of Periodontics; L.D.S., 1946, D.D.S., 1946, Toronto; M.S.D., 1962, Washington

DRISCOLL, JOHN P.,\* 1967 (1973), Professor of Education; B.A., 1948, M.S., 1950, California (Los Angeles); Certificate—Pedagogy, 1955, Perugia; Ph.D., 1957, Pennsylvania State

DRIVER, CHARLES HENRY,\* 1965, Professor of Forest Pathology; B.S.F., 1947, M.S.F., 1950, Georgia; Ph.D., 1954, Louisiana State

DRUI, ALBERT BURNELL,\* 1960 (1969), Associate Professor of Mechanical Engineering; B.S. in I.E., 1949, M.S. in I.E., 1957, Washington (St. Louis)

DUBISCH, ROY,\* 1961, Professor of Mathematics; B.S., 1938, M.S., 1940, Ph.D., 1943, Chicago

DUCKETT, MARGARET RUTH, 1947 (1972), Associate Professor Emeritus of English; A.B., 1926, Winthrop; M.A., 1941, North Carolina

DUDLEY, DONALD L., 1969 (1972), Associate Professor of Psychiatry and Behavioral Sciences; B.S., 1958, Puget Sound; M.D., 1964, Washington

DUFF, GRAHAM L., 1966 (1973), Research Associate Professor of Electrical Engineering and Bioengineering; B.Eng., 1961, McGill; M.S., 1963, Ph.D., 1966, Illinois

DUGDALE, RICHARD C., 1967, Research Professor of Oceanography; B.S., 1950, M.S., 1951, Ph.D., 1955, Wisconsin

DULL, JACK L.,\* 1965 (1970), Associate Professor of History and East Asian Studies; B.A., 1955, M.A., 1960, Ph.D., 1966, Washington

DUNHAM, DANNY, 1973, Research Associate in Environmental Health; B.S., 1971, M.S., 1973, Central Washington State

DUNLOP, WILLIAM MOFFAT, 1962 (1966), Assistant Professor of English; B.A., 1960, M.A., 1964, Cambridge

DUNN, RICHARD JOHN,\* 1967 (1971), Associate Professor of English; B.A., 1960, Allegheny; M.A., 1961, Ph.D., 1964, Western Reserve

DUNN, WALTER L.,\* 1954 (1968), Professor of Civil Engineering; B.S. in C.E., 1949, Montana State; M.P.H., 1953, California

DUNNE, THOMAS, 1973, Assistant Professor of Geological Sciences; B.A., 1964, Cambridge; Ph.D., 1969, Johns Hopkins

DUNNELL, ROBERT C.,\* 1967 (1971), Associate Professor and Chairman of Anthropology; Adjunct Curator, Burke Memorial-Washington State Museum; B.A., 1964, Kentucky; Ph.D., 1967, Yale

DÜNNHAUPT, GERHARD, 1972, Assistant Professor of Germanic Languages and Literature; B.A., 1966, Toronto; A.M., 1970, Ph.D., 1972, Brown

DUNTHORNE, STEPHEN, 1961, Lecturer in Art; B.A., 1949, M.F.A., 1950, Washington DU PEN, EVERETT, \* 1945 (1960), Professor of Art; B.F.A., 1937, Yale

DUPLICA, MOYA M.,\* 1963 (1969), Associate Professor of Social Work; B.A., 1954, British Columbia; M.S.W., 1956, St. Louis

DURFEE, ALAN,\* 1973, Assistant Professor of Mathematics; A.B., 1966, Harvard; Ph.D., 1971, Cornell

DUXBURY, ALYN C., 1964 (1972), Research Associate Professor of Oceanography; B.S., 1955, M.S., 1956, Washington; Ph.D., 1963, Texas A&M

DVORAK, AUGUST, 1923 (1964), Professor Emeritus of Education; B.A., 1920; Ph.D., 1923, Minnesota

DWINELL, LORIA L.,\* 1973, Instructor in Social Work; B.A., 1969, New Mexico; M.S.W., 1971, Washington

DYBWAD, LINDA H.,\* 1972, Assistant Professor of Law; B.A., 1967, California State (Los Angeles); J.D., 1970, California (Los Angeles)

DYER, DONALD C.,\* 1968, Assistant Professor of Pharmacology; B.S., 1961, Ph.D., 1965, Kansas

# Е

EASTMAN, AUSTIN VITRUVIUS, 1924 (1969), Professor Emeritus of Electrical Engineering; B.S. in E.E., 1922, M.S. in E.E., 1929, Washington

EASTMAN, CAROL M.,\* 1967 (1973), Associate Professor of Anthropology and African Studies; Adjunct Associate Professor of Linguistics; B.A., 1963, Massachusetts; Ph.D., 1967, Wisconsin

EASTMAN, FRED SCOVILLE, 1927 (1970), Professor Emeritus of Aeronautics and Astronautics; B.S. in E.E., 1925, Washington; M.S., 1929, Massachusetts Institute of Technology

EBY, EDWIN HAROLD, 1927 (1968), Professor Emeritus of English; Ph.B., 1923, Chicago; Ph.D., 1927, Washington

ECHOLS, RONALD H., 1966, Research Assistant Professor of Oceanography; B.S., 1959, M.S., 1960, Florida; Ph.D., 1967, Southern California

EDDY, EDWARD M.,\* 1970 (1972), Assistant Professor and Administrative Officer in Biological Structure; S.B., 1962, S.M., 1964, Kansas State; Ph.D., 1967, Texas

EDELSTEIN, ALEX S.,\* 1955 (1966), Professor of Communications; Director, School of Communications; A.B., 1946, San Francisco State; M.A., 1948, Stanford; Ph.D., 1958, Minnesota

EDMONDSON, W. THOMAS,\* 1949 (1957), Professor of Zoology; B.S., 1938, Ph.D., 1942, Yale

EDMONSON, COLIN NEIL,\* 1960 (1967), Associate Professor and Chairman of Classics; Adjunct Curator of Classical Archaeology, Burke Memorial-Washington State Museum; B.A., 1950, Arizona; M.A., 1955, Ph.D., 1966, California (Berkeley)

EDWARDS, ALLEN L.,\* 1944 (1948), Professor of Psychology; B.A., 1937, Central\*College (Chicago); M.A., 1938, Ohio State; Ph.D., 1940, Northwestern

EDWARDS, JOHN S.,\* 1967 (1970), Professor of Zoology; B.Sc., 1954, M.Sc., 1956, Auckland; Ph.D., 1960, Cambridge

EENMAA, JURI, 1971, Research Associate in Radiology; M.S., 1966, B.S., 1963, Southern California EGAN, JAMES E., 1972, Assistant Professor of Naval Science; B.S., 1967, Oregon College of Education

EGGERS, DAVID F., JR.,\* 1950 (1963), Professor of Chemistry; B.S., 1943, Illinois; Ph.D., 1951, Minnesota

EGGERT, LEONA L., 1973, Instructor in Psychosocial Nursing; Diploma, 1958, Vancouver General Hospital; B.S., 1969, M.A., 1970, Washington

EHRENBERG, JOHN E., 1973, Research Assistant Professor of Electrical Engineering; Assoclate Engineer, Applied Physics Laboratory; Associate Engineer, Division of Marine Resources; B.S., 1966, S.M.E.E., 1968, Massachuseits Institute of Technology; Ph.D., 1973, Washington

EICHENBAUM, JACK J., 1971 (1973), Lecturer in Geography; B.Ch.E., 1963, Cooper Union; M.S., 1965, Indiana; Ph.D., 1972, Michigan

EICHENBERGER, RODNEY BRYCE,\* 1963 (1969), Associate Professor of Music; B.A., 1952, St. Olaf; M.A., 1958, Denver

EICHINGER, BRUCE E.,\* 1968, Assistant Professor of Chemistry; B.S., 1963, Minnesota; Ph.D., 1967, Stanford

EICHINGER, WALTER A.,\* 1936 (1973), Professor of Music; B.Mus., 1932, M.Mus., 1933, Northwestern

EISDORFER, CARL, 1972, Professor and Chairman of Psychiatry and Behavioral Sciences; Adjunct Professor of Psychology; B.A., 1951, M.A., 1953, Ph.D., 1959, New York; M.D., 1964, Duke

EISDORFER, SUSAN, 1973, Research Associate in Psychiatry and Behavioral Sciences; B.A., 1961, George Washington; M.A., 1969, American

EISENBERG, IRWIN, 1966, Lecturer in Music; Eastman School of Music, Rochester

EKSE, MARTIN I., 1948 (1973), Professor Emeritus of Civil Engineering; B.S., 1932, South Dakota State; M.S., 1948, Wisconsin

ELIAS, ZIAD M.,\* 1969, Associate Professor of Civil Engineering; Ingenieur, 1958, Ecole Centrale des Arts et Manufactures; Sc.D., 1963, Massachusetts Institute of Technology

ELLIOTT, EUGENE C., 1953 (1959), Associate Professor of Humanistic-Social Studies; Vice Provost for Academic Services; B.A., 1936, M.A., 1941, Washington; Docteur de l'Universite, 1952, University of Paris (Sorbonne)

ELLIOTT, PATRICA C., 1973, Associate Professor of Accounting; B.B.A., 1963, Eastern New Mexico; M.B.A., 1966, Denver; D.B.A., 1972, Colorado; C.P.A., 1964, State of New Mexico, 1965, State of Colorado

ELLIS, JACK A. N.,\* 1966 (1970), Associate Professor and Assistant Dean of Social Work; B.A., 1951, M.S.W., 1955, British Columbia

ELLISON, HERBERT J.,\* 1968 (1965), Professor of History and Russian and East European Studies; Director, Institute for Comparative and Foreign Area Studies; Director, University International Programs; B.A., 1951, Washington; M.A., 1952, Ph.D., 1955, London

ELLRICH, ROBERT JOHN,\* 1964 (1969), Associate Professor of French Language and Literature and Comparative Literature; B.A., 1952, M.A., 1953, Ph.D., 1960, Harvard

ELMER, GARY W.,\* 1971, Assistant Professor of Pharmacognosy; B.S., 1963, M.S., 1966, Connecticut; Ph.D., 1970, Rutgers

EMANUEL, IRVIN,\* 1964 (1970), Associate Professor of Epidemiology and International Health and Pediatrics; Director, Child Development and Mental Retardation Center; B.S., 1951, Rutgers; M.A., 1956, Arizona; M.D., 1960, Rochester; M.S., 1966, Washington

EMERSON, DONALD E.,\* 1946 (1953), Associate Professor of History; A.B., 1937, Johns Hopkins; M.A., 1938, Columbia; Ph.D., 1942, Johns Hopkins

EMERSON, RICHARD M.,\* 1964 (1970), Professor of Sociology; B.A., 1950, Utah; M.A., 1952, Ph.D., 1955, Minnesota

EMERY, ASHLEY FRANCIS,\* 1961 (1969), Professor of Mechanical Engineering; B.S., 1956, M.S., 1958, Ph.D., 1961, California (Berkeley)

EMERY, DONALD WILLIAM, 1934 (1973), Professor Emeritus of English; B.A., 1927, M.A., 1928, Iowa

ENGLISH, THOMAS SAUNDERS,\* 1959 (1965), Associate Professor of Oceanography; B.S., 1950, M.S., 1951, Iowa State; Ph.D., 1961, Washington

ENSINCK, JOHN W., 1960 (1968), Professor of Medicine; Director, Clinical Research Center, University Hospital; B.S., 1952, M.D.C.M., 1956, McGill

ENWONWU, CYRIL O.,\* 1968 (1972), Associate Professor of Oral Biology; B.Sc., 1957, Ibadan; B.D.S., 1961, M.D.S., 1966, Bristol; D.Sc., 1968, Massachusetts Institute of Technology

EPIOTIS, NICHOLAS D.,\* 1972, Assistant Professor of Chemistry; B.A., 1965, Ripon; M.A., 1967, Harvard; Ph.D., 1972, Princeton

ERICKSON, HARVEY D.,\* 1947 (1959), Professor of Wood Science and Technology; B.S., 1933, B.S., 1934, M.S., 1936, Ph.D., 1937, Minnesota

ERICKSON, J. DAVID,\* 1972, Assistant Professor of Epidemiology and International Health and Periodontics; D.D.S., 1964, Alberta; M.P.H., 1969, Minnesota; Ph.D., 1972, Washington

ERICKSON, JOHN W.,\* 1956 (1960), Associate Professor of Art; Associate Director, School of Art; B.S., 1941, B.F.A., 1947, M.F.A., 1951, Illinois

ERICKSON, KENT BRUCE,\* 1973, Assistant Professor of Mathematics; B.S., 1964, M.S., 1966, Georgia Institute of Technology; Ph.D., 1970, Wisconsin

ERICKSON, MARCENE POWELL,\* 1966 (1969), Assistant Professor of Maternal and Child Nursing; Diploma, 1959, Good Samaritan Hospital, Portland; B.S., 1962, Oregon; M.N., 1966, Washington

ERICKSON, RICHARD C., 1971 (1973), Assistant Professor of Psychiatry and Behavioral Sciences; B.S., 1959, Washington; M.D., 1962, Fuller Theological Seminary; Ph.D., 1969, Washington

ERICSSON, LOWELL H., 1960 (1966), Associate in Biochemistry; B.S., 1950, Beloit

ERIKSEN, NILS, 1952 (1957), Research Assistant Professor of Pathology; B.S., 1939, Ph.D., 1944, Washington

ESPINOLA, JUDITH C.,\* 1968 (1969), Assistant Professor of Speech; B.A., 1961, Emerson; M.A., 1963, Oklahoma; Ph.D., 1969, Northwestern

ESTES, NADA J.,\* 1961 (1964), Assistant Professor of Psychosocial Nursing; B.S., 1955, Iowa; M.S.N., 1958, Colorado

ETCHESON, WARREN W.,\* 1954 (1960), Professor of Marketing; Associate Dean for Undergraduate Programs, School of Business Administration; B.S., 1942, Indiana; M.A., 1951, Ph.D., 1956, Iowa EVANS, BERNARD W.,\* 1969, Professor of Geological Sciences; B.S., 1955, King's College, London; D.Phil., 1959, Oxford

EVANS, CHARLES A.,\* 1946, Professor of Microbiology; B.S., 1935, B.M., 1936, M.D., 1937, Ph.D., 1943, Minnesoía

EVANS, ELEANOR, 1944 (1954), Assistant Professor of Psychology; Lecturer in Education; B.S., 1934, Illinois; M.E., 1940, Winnetka Teachers

EVANS, ELLIS DALE,\* 1964 (1971), Professor of Education; B.M.Ed., 1956, Kansas; M.S.Ed., 1962, Ed.D., 1964, Indiana

EVANS, ROBERT S., 1951 (1959), Professor of Medicine; B.S., 1934, Washington; M.D., 1938, Harvard

EVANS, ROGER J.,\* 1966 (1971), Associate Professor of Civil Engineering; Adjunct Associate Professor of Geophysics; B.Sc., 1955, Birmingham (England); Sc.M., 1959, Brown; Ph.D., 1965, California (Berkeley)

EVERETT, GAITHER B., 1967 (1970), Assistant Professor of Anesthesiology, Veterans Administration Hospital; D.D.S., 1963, Washington

EVERETT, N. B.,\* 1946 (1957), Professor and Chairman of Biological Structure; B.S., 1937, M.S., 1938, North Texas State; Ph.D., 1942, Michigan

#### F

FAALAND, BRUCE H., 1971, Assistant Professor of Quantitative Methods; B.S., 1966, M.S., 1967, Ph.D., 1972, Stanford

FAIN, SAMUEL C., JR.,\* 1969, Assistant Professor of Physics; B.A., 1965, Reed; M.S., 1966, Ph.D., 1969, Illinois

FAIRHALL, ARTHUR W.,\* 1954 (1963), Professor of Chemistry, Geophysics, and Physics; B.Sc., 1946, Queen's (Ontario); Ph.D., 1952, Massachusetts Institute of Technology

FALES, MARTHA H., 1959 (1973), Professor of Dental Hygiene; Director, Department of Dental Hygiene; R.D.H., 1935, A.B.Ed., 1943, M.A., 1968, Michigan

FALKOW, STANLEY,\* 1972, Professor of Microbiology; Adjunct Professor of Genetics; B.S., 1955, Maine; M.S., 1960, Ph.D., 1961, Brown

FALLS, GREGORY A.,\* 1961, Professor of Drama; B.A., 1943, Park; M.A., 1949, Ph.D., 1953, Northwestern

FANCHER, JOANNA E., 1971, Assistant Professor of Physiological Nursing; A.B., 1950, Houghton; M.N., 1953, Western Reserve; M.A., 1963, Columbia

FANGMAN, WALTON L.,\* 1967 (1972), Associate Professor of Genetics; B.A., 1962, Bellarmine; Ph.D., 1965, Purdue

FARBER, ARTHUR S.,\* 1964 (1969), Professor of Social Work; B.A., 1938, Brooklyn; M.S., 1941, Columbia; Adv. Gf., 1951, Pennsylvania

FARIS, ROBERT E. LEE, 1948, Professor Emeritus of Sociology; Ph.B., 1928, M.A., 1930, Ph.D., 1931, Chicago

FARNER, DONALD S.,\* 1965, Professor of Zoophysiology; Chairman, Department of Zoology; B.S., 1937, Hamline; M.A., 1939, Ph.D., 1941, Wisconsin

FARRAND, LINDA L., 1973, Instructor in Family and Community Nursing; B.S., 1969, Rochester; M.N., 1973, Washington FARRELL, DONALD F., 1971, Assistant Professor of Medicine; M.D., 1965, George Washington

FARRELL, NARDA B., 1972 (1973), Instructor in Dental Hygiene; B.S., 1970, Washington

FARWELL, GEORGE WELLS,\* 1948 (1959), Professor of Physics; Vice President for Research; S.B., 1941, Harvard; Ph.D., 1948, Chicago

FEA, HENRY ROBERT,\* 1954 (1964), Professor of Education; B.A., 1941, B.Ed., 1946, M.Ed., 1948, Saskatchewan; Ph.D., 1950, California (Berkeley)

FEFER, ALEXANDER, 1968 (1973), Associate Professor of Medicine; B.A., 1959, Harvard; M.D., 1964, Stanford

FEIGL, ERIC 0.,\* 1969 (1972), Professor of Physiology and Biophysics; B.S., B.A., 1954, M.D., 1958, Minnesota

FEIGL, POLLY,\* 1969 (1971), Associate Professor of Biostatistics; B.A., B.S., 1956, Chicago; M.A., 1957, Ph.D., 1961, Minnesota

FELIX, WILLIAM L., JR.,\* 1969 (1972), Associate Professor of Accounting; B.S., 1961, M.S., 1962, Montana; Ph.D., 1969, Ohio State

FELLNER, CARL, 1972, Professor of Psychiatry and Behavioral Sciences; M.D., 1952, Lausanne

FELSENSTEIN, JOSEPH,\* 1967 (1973), Associate Professor of Genetics; B.S., 1964, Wisconsin; Ph.D., 1968, Chicago

FELTON, HARRY F., 1973, Research Associate in Health Services

FELTON, SAMUEL P., 1959, Research Associate in Fishries; B.S., 1951, Washington

FENN, MARGARET P.,\* 1953 (1964), Associate Professor of Organizational Behavior; B.S., 1942, LaCrosse State Teachers; M.B.A., 1950, D.B.A., 1963, Washington

FENNER, ROBERT H., 1968, Assistant Professor of Education; Associate Director, Counseling Center; Lecturer in Psychology; B.A., 1957, M.A., 1962, Ph.D., 1965, Colorado

FERNALD, ROBERT L.,\* 1946 (1968), Professor of Zoology; A.B., 1937, Monmouth; Ph.D., 1941, California (Berkeley)

FERRILL, ARTHER L.,\* 1964 (1969), Associate Professor of History; B.A., 1960, Wichita; M.A., 1961, Ph.D., 1964, Illinois

FETZ, EBERHARD E.,\* 1969, Assistant Professor of Neurological Surgery and Physiology and Biophysics; Core Staff of Regional Primate Research Center; B.S., 1961, Rensselaer Polytechnic Institute; Ph.D., 1967, Massachusetts Institute of Technology

FIALKOW, PHILIP J.,\* 1965 (1973), Professor of Medicine and Genetics; A.B., 1956, Pennsylvania; M.D., 1960, Tufts

FIEDLER, FRED E.,\* 1969, Professor of Psychology; A.M., 1947, Ph.D., 1949, Chicago

FIELD, DONALD REED,\* 1970 (1973), Associate Professor of Forest Resources; Adjunct Associate Professor of Environmental Studies; B.S., 1963, M.S., 1965, Wisconsin; Ph.D., 1968, Pennsylvania State

FIELD, WILLIAM HUGH,\* 1964 (1965), Assistant Professor of French Language and Literature; M.A., 1951, Edinburgh; Ph.D., 1965; Chicago

FIELDS, PAUL E.,\* 1955, Professor of Psychology; A.B., 1926, A.M., 1927, Ohio Wesleyan; Ph.D., 1930, Ohio State

FIGGE, DAVID C., 1956 (1970), Professor of Obstetrics and Gynecology; B.S., 1949, M.D., 1950, Northwestern



FIGLEY, MELVIN M.,\* 1958, Professor and Chairman of Radiology; B.S., 1941, Dartmouth; M.D., 1944, Harvard

FINCH, CLEMENT A., 1949 (1955), Professor of Medicine; B.S., 1936, Union; M.D., 1941, Rochester

FINE, RUTH B., 1960 (1968), Associate Professor of Comparative Nursing Care Systems; Director, Nursing Services, and Associate Hospital Administrator, University Hospital; Diploma, 1939, Garfield Memorial Hospital; B.S., 1956, M.N., 1957, Washington

FINK, B. RAYMOND, 1964, Professor of Anesthesiology; Assistant Chairman for Research in Anesthesiology; M.B., B.S., 1933, B.Sc., 1935, University College (London); M.R.C.S., 1938, England

FINLAYSON, BRUCE A.,\* 1967 (1972), Associate Professor of Chemical Engineering; B.S.Ch.E., 1961, M.S.Ch.E., 1963, Rice; Ph.D., 1965, Minnesota

FINNE, GUNNAR, 1973, Lecturer in Fisheries; B.S. in Chemistry, 1962, M.S. in Chemistry, Education, and Food Science, 1963, Queens University, Belfast, Ireland; Diploma Ed., 1967, Bergen University, Norway; M.S. in Food Science, 1971, Washington

FIREY, JOSEPH CARL,\* 1954 (1961), Professor of Mechanical Engineering; B.S. in M.E., 1940, Washington; M.S. in M.E., 1941, Wisconsin

FISCHBACH, DAVID B., 1969, Research Associate Professor of Ceramic Engineering; B.A., 1950, Denison; M.S., 1951, Ph.D., 1955, Yale

FISCHER, EDMOND H.,\* 1953 (1961), Professor of Biochemistry; B.S., 1943, Ph.D., 1947, Geneva

FISCHER, LOUIS,\* 1926 (1945), Professor of Pharmaceutical Chemistry; Director of Student Affairs; B.S., 1926, Ph.C., 1926, M.S., 1928, Ph.D., 1933, Washington

FISH, JOHN ORTON,\* 1962 (1971), Assistant Professor of Environmental Health; Deputy Director, Environmental Health and Safety; B.S., 1949, Washington; M.P.H., 1959, Michigan

FISHER, ALAN SIMONTON,\* 1968 (1969), Assistant Professor of English; B.A., 1962, M.A., 1964, Ph.D., 1969, California (Berkeley)

FISHER, CATHERINE I., 1973, Instructor in Family and Community Nursing; B.S., 1947, M.N., 1952, Washington

FISHER, LLOYD D., JR.,\* 1966 (1970), Associate Professor of Biostatistics; S.B., 1961, Massachusetts Institute of Technology, M.A., 1965, Ph.D., 1966, Dartmouth

FITCHEN, RICHARD B., 1972, Assistant Professor of Communications; B.A., 1964, M.A., 1966, San Jose State; Ph.D., 1971, California (Santa Barbara)

FITZGERALD, PATRICIA A., 1966 (1971), Assistant Professor of Comparative Nursing Care Systems; B.S., 1955, Georgetown; M.N., 1966, Washington

FLAHERTY, MARVIN J., 1965 (1973), Lecturer in, and Acting Chairman of, Building Construction; B.A., 1958, M.B.A., 1959, Washington

FLAJSER, STEVEN H., 1970 (1973), Research Assistant Professor in Social Management of Technology; B.S., 1965, California (Berkeley); Ph.D., 1970, Washington

FLATHMAN, RICHARD E.,\* 1972, Professor and Chairman of Political Science; B.A., 1956, Macalester; M.A., 1958, Ph.D., 1961, California (Berkeley)

FLATIN, KJETIL A., 1972, Assistant Professor of Scandinavian Languages and Literature; Cand. mag., 1967, Oslo; M.A., 1968, Ph.D., 1971, Washington

FLEAGLE, ROBERT G.,\* 1948 (1956), Professor and Chairman of Atmospheric Sciences; Adjunct Professor of Geophysics and Institute of Marine Studies; A.B., 1940, Johns Hopkins; M.S., 1944, Ph.D., 1949, New York

FLEET, WENDELL P., 1968 (1972), Instructor in Medicine; B.S., 1961, St. Mary's; M.D., 1965, Creighton

FLEMING, DOUGLAS K.,\* 1965 (1972), Associate Professor of Geography; B.A., 1944, Princeton; Ph.D., 1965, Washington

FLEMING, RICHARD H.,\* 1951, Professor of Oceanography; B.A., 1929, M.A., 1931, British Columbia; Ph.D., 1935, California (La Jolla)

FLETCHER, ROBERT L.,\* 1956 (1960), Professor of Law; A.B., 1939, LL.B., 1947, Stanford

FLETCHER, T. LLOYD, 1951 (1967), Professor of Surgery; A.B., 1937, M.A., 1938, Clark; Ph.D., 1949, Wisconsin

FLINT, BARBARA J., 1973, Acting Assistant Professor of History; B.S., 1965, Lincoln; M.A., 1968, Chicago

FOLLAND, GERALD B.,\* 1973, Assistant Professor of Mathematics; A.B., 1968, Harvard; M.S., 1970, Ph.D., 1971, Princeton

FONTANA, DARLENE DIANE, 1972, Acting Assistant Professor of Home Economics; B.S., 1962, Washington State; M.S., 1968, Columbia

FOOTE, HOPE LUCILLE, 1923 (1948), Professor Emeritus of Art; A.B., 1920, Iowa State Teachers; M.A., 1923, Columbia

FORD, PAUL WILLIAM,<sup>\*</sup> 1957 (1969), Associate Professor of Mechanical Engineering; B.Ind.E., 1956, General Motors Institute; M.S. in M.E., 1959, Washington

FORDYCE, WILBERT E.,\* 1947 (1970), Professor of Rehabilitation Medicine; B.S., 1948, M.S., 1951, Ph.D., 1953, Washington

FORRESTER, WILLIAM D., 1972, Instructor in Drama; B.S., 1962, Oregon; M.F.A., 1969, Yale

FORREY, ARDEN W., 1963 (1973), Research Assistant Professor of Medicine; A.B., 1955, Ph.D., 1963, Washington

FORSTER, JERALD R.,\* 1966 (1969), Associate Professor of Education; B.S., 1958, Ph.D., 1966, Minnesota

FORTSON, EDWARD NORVAL,\* 1962 (1969), Associate Professor of Physics; B.S., 1957, Duke; Ph.D., 1963, Harvard

FOSTER, CLIFFORD DONALD,\* 1959 (1968), Professor of Education; B.S., 1947, Northeast Missouri State Teachers; M.A., 1952, Ph.D., 1957, Washington

FOSTER, JAMES, 1972, Research Associate in Environmental Health; B.S., 1960, M.S., 1964, California (Los Angeles)

FOUCHT, RICHARD A., 1971, Associate Professor of Naval Science; B.S., 1961, M.S., 1968, United States Naval Postgraduate School, Monterey

FOWLER, DAVID C.,\* 1952 (1963), Professor of English; B.A., 1942, Florida; M.A., 1947, Ph.D., 1949, Chicago

FOWLER, ROY S., JR.,\* 1965 (1973), Associate Professor of Rehabilitation Medicine; B.A., 1960, Willamette; M.S., 1963, Ph.D., 1966, Washington

FOWLER, WILTON B.,\* 1969, Associate Professor of History: B.A., 1960, South Carolina; M.A., 1962, Ph.D., 1966, Yale FOX, JOHN P.,\* 1965, Professor of Epidemiology and International Health; B.S., 1929, Haverford; M.D., Ph.D., 1936, Chicago; M.P.H., 1948, Columbia

FOX, KATHARINE SHIRLEY,\* 1945 (1965), Associate Professor of Physical Education; B.S., 1938, Washington; M.S., 1943, Oregon; Ph.D., 1955, Iowa

FOY, HJORDIS M.,\* 1968 (1972), Associate Professor of Epidemiology and International Health; M.D., 1953, Karolinska (Stockholm); M.S., 1967, Ph.D., 1968, Washington

FRANK, LAWRENCE DYER, 1969, Assistant Professor of English; B.A., 1955, Williams; M.A., 1960, Michigan; Ph.D., 1968, Minnesota

FRANK, RICHARD P.,\* 1971, Assistant Professor of Prosthodontics; D.D.S., 1962, Iowa; M.S.D., 1968, Washington

FRANK, ROBERT,\* 1969, Professor of Environmental Health; A.B., 1941, Virginia; M.D., 1945, New York Downstate Medical Center

FRANZKE, ALBERT LEONARD, 1936 (1964), Associate Professor Emeritus of Speech; B.A., 1916, M.A., 1923, Lawrence

FREEHILL, MAURICE FRANCIS,\* 1962, Professor of Education; B.Ed., 1946, Alberta; M.A., 1947, Ed.D., 1948, Stanford

FRENCH, WENDELL L.,\* 1958 (1962), Professor of Management and Organization; Associate Dean of Graduate Programs, School of Business Administration; B.A., 1948, M.P.S., 1949, D.Ed., 1956, Harvard

FRERICHS, ALBERTA J., 1955 (1973), Associate Professor of Education; B.Sc., 1940, Nebraska State Teachers; M.Ed., 1951, Nebraska

FREUND, FELIX G., 1963 (1965), Associate Professor of Anesthesiology; Chief, Anesthesiology, Harborview Medical Center; M.D., 1948, Universidad Nacional de Buenos Aires

FREY, CHARLES HUBBARD, 1970 (1972), Assistant Professor of English; B.A., 1957, Yale; J.D., 1960, Harvard; Ph.D., 1972, Yale

FRIEDMAN, LIONEL J.,\* 1961 (1967), Professor of French Language and Literature; B.A., 1943, M.A., 1946, Ph.D., 1950, Harvard

FRIEDRICH, PIA, 1965 (1970), Assistant Professor of Italian Languages and Literature; Ph.D., 1946, Università degli Studi (Torino)

FRIMER, MORRIS, 1969 (1972), Research Associate in Medicine; B.S.E.E., 1964, Lowell Technical Institute; M.S.E., 1969, Alabama

FRITSCHEN, LEO JOSEPH,\* 1966 (1972), Professor of Forest Meteorology; Adjunct Professor of Atmospheric Sciences; Chairman, Division of Biological Sciences; B.S., 1952, M.S., 1958, Kansas State; Ph.D., 1960, Iowa State

FROST, BRUCE W.,\* 1969, Assistant Professor of Oceanography; B.A., 1963, Bowdoin; Ph.D., 1968, California (San Diego)

FROST, PETER A.,\* 1969, Associate Professor of Finance and Business Economics; B.A., 1959, Occidental; M.A., 1961, Ph.D., 1966, California (Los Angeles)

FRY, LOUIS R., 1962 (1971), Associate Professor of Orthopaedics; B.A., 1951, Denison; M.D., 1955, Temple

FUCHS, ALBERT F.,\* 1968 (1971), Associate Professor of Physiology and Biophysics; B.S., 1960, M.S., 1961, Drexel Institute of Technology; Ph.D., 1966, Johns Hopkins

FUJIKAWA, KAZUO, 1971, Research Assistant Professor of Biochemistry; B.A., 1959, Kyoto College of Pharmacy; M.A., 1961, Ph.D., 1965, Kyoto FUJIMOTO, WILFRED Y., 1969 (1971), Assistant Professor of Medicine; A.B., 1962, M.D., 1965, Johns Hopkins

FULLER, STEVEN,\* 1946 (1958), Associate Professor of Art; B.A., 1939, M.F.A., 1948, Washington

FUREDY, RONALD L., 1971, Instructor in Psychiatry and Behavioral Sciences; B.A., 1963, California (Los Angeles); M.D., 1967, Southern California

FUTTERMAN, SIDNEY, 1966 (1972), Professor of Ophthalmology; B.S., 1950, M.S., 1952, Ph.D., 1954, George Washington

FYFE, IAN MILLAR,\* 1959 (1967), Professor of Aeronautics and Astronautics; B.S. in M.E., 1950, Strathclyde; M.M.E. in M.E., 1954, Delaware; Ph.D. in Engineering Mechanics, 1958, Stanford

#### G

GADDUM-ROSSE, PENELOPE, 1966 (1972), Research Assistant Professor of Biological Structure; B.Sc., 1962, Wales; Ph.D., 1965, Liverpool

GALE, CHARLES C.,\* 1964 (1971), Associate Professor of Physiology and Biophysics; B.A., 1951, Arizona State; Ph.D., 1960, Pennsylvania; Fil.lic., 1963, Fil.dr., 1964, Stockholm

GALE, JAMES L.,\* 1967 (1972), Associate Professor of Epidemiology and International Health; Associate Dean, School of Public Health and Community Medicine; A.B., 1957, Harvard; M.D., 1961, Columbia; M.S., 1969, Washington

GALLAGHER, MARIAN GOULD,\* 1944 (1953), Professor of Law; Law Librarian; B.A., 1935, LL.B., 1937, B.A. Libr., 1939, Washington

GALLANT, JONATHAN A.,\* 1961 (1970), Professor of Genetics; B.S., 1957, Ph.D., 1961, Johns Hopkins

GALLE, KURT ROBERT,\* 1960, Associate Professor of Mechanical Engineering; B.S. in A.E., 1946, B.S. in M.E., 1947, M.S. in M.E., 1949, Ph.D., 1951, Purdue

GALLUCCI, VINCENT FRANK,\* 1972 (1973), Assistant Professor of Fisheries; Adjunct Assistant Professor of Biostatistics; B.S., 1963, State University of New York (Stony Brook); M.S., 1966, State University of New York (Buffalo); Ph.D., 1971, North Carolina State

GALSTAUN, VANICK S.,\* 1950 (1959), Assistant Professor of Drama; B.A., 1946, San Francisco State; M.A., 1948, Washington

GALT, ALAN B.,\* 1966 (1971), Assistant Professor of Germanic Languages and Literature; B.A., 1961, Washington; M.A., 1963, Ph.D., 1971, Indiana

GANGOLLI, RAMESH ANAND,\* 1962 (1967), Professor of Mathematics; B.A., 1954, Elphinstone, Bombay; B.A., 1957, Cambridge; Ph.D., 1961, Massachusetts Institute of Technology

GANZER, VICTOR MARTIN,\* 1947 (1953), Professor of Aeronautics and Astronautics; B.A. in Mathematics, 1933, Augustana (Illinois); B.S. in A.E., 1941, Washington

GARA, ROBERT IMRE,\* 1968 (1973), Professor of Forest Entomology; B.S., 1953, Utah State; M.S., 1962, Ph.D., 1964, Oregon State

GARDNER, HOWARD S.,\* 1966, Professor of Chemical Engineering and Pulp and Paper Technology; S.B., 1930, S.M., 1931, Sc.D., 1946, Massachusetts Institute of Technology

GARFIAS, ROBERT ADOLPH,\* 1962 (1968), Associate Professor of Music and Latin American Studies; Adjunct Associate Professor of Anthropology; B.A., 1956, San Francisco State; M.A., 1958, Ph.D., 1965, California (Los Angeles)

GARFIELD, VIOLA E., 1937 (1969), Professor Emeritus of Anthropology; B.A., 1928, M.A., 1931, Washington; Ph.D., 1939, Columbia

GARLID, KERMIT L.,\* 1960 (1971), Professor of Nuclear Engineering and Chemical Engineering; Associate Dean, College of Engineering; B.S., 1950, Wisconsin State (River Falls); B.Ch.E., 1956, Ph.D., 1961, Minnesoia

GARRICK, JAMES G., 1970 (1971), Associate Professor of Orthopaedics; Head, Division of Sports Medicine; B.S., 1959, South Dakota; M.D., 1961, Michigan

GARTLER, STANLEY M.,\* 1957 (1964), Professor of Medicine and Genetics; B.S., 1948, California (Los Angeles); Ph.D., 1952, California (Berkeley)

GEBALLE, RONALD,\* 1946 (1959), Professor of Physics; Associate Dean, College of Arts and Sciences; B.S., 1938, M.S., 1940, Ph.D., 1943, California (Berkeley)

GEHRIG, JOHN D.,\* 1954 (1968), Professor of Oral Surgery; D.D.S., 1946, M.S.D., 1951, Minnesota

GEISSMAR, ELSE JOHANNA-MARIE,\* 1947 (1961), Associate Professor of Music; L.R.A.M., 1937, Royal Academy, London; M.Mus., 1944, Michigan

GEITGEY, DORIS A.,\* 1966 (1973), Professor of Physiological Nursing; Associate Dean of Academic Affairs, School of Nursing; B.A.Ed., 1942, Toledo; Diploma, 1948, Los Angeles County General Hospital; M.S., 1951, Immaculate Heart; Ed.D., 1966, California

GELLERT, RONALD J., 1970, Research Assistant Professor of Obstetrics and Gynecology; B.A., 1957, New York; M.A., 1959, California (Berkeley); Ph.D., 1963, San Francisco Medical Center

GERACI, JOSEPH P., 1972 (1973), Instructor in Radiology; B.S., 1966, Maine; M.S., 1969, Ph.D., 1973, Washington

GERBER, CARL J., 1972, Assistant Professor of Psychiatry and Behavioral Sciences; B.S., 1956, Detroit; Ph.D., 1960, Washington (St. Louis); M.D., 1967, Duke

GERDES, ARTHUR J., 1967 (1969), Assistant Professor of Radiology; B.S., 1955, Wheaton; M.D., 1959, Minnesota

GERHART, JAMES BASIL,\* 1956 (1965), Professor of Physics; B.S., 1950, California Institute of Technology; M.A., 1952, Ph.D., 1954, Princeton

GERSTENBERGER, DONNA LORINE,\* 1960 (1970), Professor of English; Chairman, Undergraduate Programs and Honors; A.B., 1951, Whitman; M.A., 1952, Ph.D., 1958, Oklahoma

GESSEL, STANLEY PAUL,\* 1948 (1965), Professor of Forest Soils; Associate Dean, College of Forest Resources; B.S., 1939, Utah State Agricultural; Ph.D., 1950, California

GESSNER, FREDERICK BENEDICT,\* 1967 (1971), Associate Professor of Mechanical Engineering; B.S. in M.E., 1959, Lehigh; M.S. in M.E., 1960, Ph.D., 1964, Purdue

GEY, GEORGE O., 1970 (1972), Instructor in Medicine; A.B., 1957, Johns Hopkins; M.A., 1959; M.B.B. Chir., 1964, Cambridge

GHOSE, SUBRATA, 1972, Research Associate Professor of Geological Sciences; B.Sc., 1953, Presidency; M.Sc., 1955, Calcutta; M.S., 1959, Ph.D., 1959, Chicago GIBLETT, ELOISE R., 1952 (1967), Research Professor of Medicine; B.S., 1942, M.S., 1947, M.D., 1951, Washington

GIBLIN, ELIZABETH C.,\* 1951 (1965), Professor of Physiological Nursing; B.S., 1943, M.N., 1954, Washington; Ed.D., 1959, Colorado

GIBSON, JACK L., 1971, Associate Professor of Obstetrics and Gynecology; B.S., 1949, M.D., 1953, Arkansas

GIDDENS, WILLIAM ELLIS, JR., 1968 (1971), Assistant Professor of Pathology; D.V.M., 1961, Iowa State; M.S., 1966, Ph.D., 1968, Michigan State

GILES, FREDERIC T.,\* 1961 (1967), Professor of Education; Dean, College of Education; B.Ed., 1939, Eastern Washington College of Education; M.A., 1946, Ed.D., 1961, Washington State

GILLILAND, BRUCE, 1968 (1972), Associate Professor of Laboratory Medicine and Medicine; Head, Division of Immunology; B.A., 1956, Occidental; M.D., 1960, Northwestern

GILLINGHAM, J. BENTON,\* 1947 (1960), Associate Professor of Economics; A.B., 1939, Washington State; M.A., 1941, Wisconsin

GILSON, BETTY S.,\* 1969 (1972), Associate Professor of Health Services; Associate Dean, School of Public Health and Community Medicine; B.A., 1940, Minnesota; M.D., 1943

GLICKFELD, BARNETT WEIL,\* 1967, Assistant Professor of Mathematics; B.A., 1959, Cornell; M.A., 1960, Ph.D., 1964, Columbia

GLICKSBERG, IRVING LEONARD,\* 1962, Professor of Mathematics; B.A., 1945, Ph.D., 1951, California (Los Angeles)

GLOMSET, JOHN A., 1960 (1971), Research Professor of Medicine; M.D., 1960, Upsala

GLUCKSBERG, HAROLD, 1971 (1973), Assistant Professor of Medicine; M.D., 1964, Buffalo Medical School

GODFREY, DONALD C., 1969 (1972), Lecturer in Communications; B.S., 1969, Weber State; M.S., 1969, Oregon

GOLDBERG, LEONARD D.,\* 1947 (1963), Professor of Business Responsibilities and Comparative Business; B.A., 1943, J.D., 1945, Chicago

GOLDE, HELLMUT,\*. 1959 (1969), Professor of Electrical Engineering and Computer Science; Associate Chairman, Computer Science Group; Dig.-Ing., 1953, Technische Hochschule; M.S., 1955, Ph.D., 1959, Stanford

GOLDMAN, RICHARD A., 1970, Assistant Professor of Periodontics; B.S., 1963, Maryland; D.D.S., 1966, Baltimore; Certificate, 1970, Boston

GOLDSTEIN, ALLEN A.,\* 1964 (1965), Professor of Mathematics; B.A., 1947, St. John's College; M.A., 1952, Ph.D., 1954, Georgetown

GOLDSWORTHY, PATRICK D., 1952 (1970), Research Associate Professor of Medicine; A.B., 1941, M.A., 1947, Ph.D., 1952, California

GONZALES, BOYER,\* 1954, Professor of Art; B.S., 1931, Virginia

GOODELL, BRIAN W., 1971 (1973), Assistant Professor of Medicine; B.S., 1962, M.D., 1966, Washington

GOODNER, CHARLES J., 1962 (1967), Professor of Medicine; B.A., 1951, Reed; M.D., 1955, Utah

GOODSPEED, GEORGE E., 1919 (1957), Professor Emeritus of Geological Sciences; B.S. in Min.E., 1910, Massachusetts Institute of Technology



GORBMAN, AUBREY;\* 1963, Professor of Zoology; A.B., 1935, M.S., 1936, Wayne; Ph.D., 1940, California (Berkeley)

GORDON, ALBERT M.,\* 1964 (1970), Associate Professor of Physiology and Biophysics; B.S., 1956, Rochester; Ph.D., 1961, Cornell

GORDON, GUY G.,\* 1949 (1962), Professor of Marketing; B.A., 1949, M.B.A., 1950, Washington; Ph.D., 1957, California

GORDON, HERBERT P.,\* 1966 (1972), Associate Professor of Oral Biology; B.S., 1952, D.D.S., 1954, Pittsburgh; Ph.D., 1966, Pennsylvaria

GORDON, MILTON P.,\* 1959 (1966), Professor of Biochemistry; B.A., 1950, Minnesota; Ph.D., 1953, Illinois

GORDON, RICHARD C.,\* 1965, Assistant Professor of Oral Surgery; A.B., 1956, D.D.S., 1960, M.S., 1964, Michigan

GORE, WILLIAM J.,\* 1966, Professor of Political Science; A.B., 1948, Washington; M.P.A., 1950, Ph.D., 1952, Southern California

GOTSHALL, ROBERT A., 1967 (1973), Assistant Professor of Medicine; B.A., 1958; M.D., 1961, California

GOTTFRIED, ALEX,\* 1950 (1961), Associate Professor of Political Science; B.Ed., 1941, A.M., 1948, Ph.D., 1952, Chicago

GOTTLIEB, NAOMI R.,\* 1970 (1971), Associate Professor of Social Work; B.A., 1944, Hunter; M.S.W., 1949, D.S.W., 1970, California (Berkeley)

GOULD, FLORENCE JONES, 1948 (1971), Associate Professor Emeritus of English; A.B., 1928, M.A., 1931, Oregon

GOULD, KENNETH L., 1965 (1973), Assistant Professor of Medicine; A.B., 1960, Oberlin; M.D., 1964, Western Reserve

GOUTERMAN, MARTIN P.,\* 1965 (1968), Professor of Chemistry; B.A., 1951, M.S., 1955, Ph.D., 1958, Chicago

GRAHAM, C. BENJAMIN, 1963 (1969), Associate Professor of Radiology and Pediatrics; B.A., 1954, Illinois; M.D., 1958, Washington

GRANBERG, GRACE GRINDALL,\* 1960 (1965), Assistant Professor of Home Economics; B.S., 1934, M.S., 1960, Washington

GRANEY, DANIEL O.,\* 1966 (1968), Assistant Professor of Biological Structure; A.B., 1958, California (Berkeley); M.A., 1962, Ph.D., 1965, California (San Francisco)

GRATHWOHL, HARRISON L.,\* 1958 (1960), Associate Professor of Marketing; B.S., 1951, M.B.A., 1952, D.B.A., 1957, Indiana

GRAVES, HELEN H.,\* 1958 (1972), Assistant Professor of Psychosocial Nursing; Diploma, 1936, Kahler School of Nursing; B.S., 1952, Washington; M.S., 1960, Colorado

GRAY, CAROL ANN, 1971, Assistant Professor of Education; B.A., 1957, Washington; M.Ed., 1958, Western Washington State; Ph.D., 1971, Washington

GRAY, FLORENCE I.,\* 1945 (1959), Associate Professor of Comparative Nursing Care Systems; Assistant Dean and Director of Undergraduate Programs; B.S., 1945, M.S.N., 1950, Washington

GRAY, GORDON MILES, 1970 (1972), Research Associate Professor of Mechanical Engineering; Head, Plans and Programs, Applied Physics Laboratory; B.S., 1950, United States Naval Academy; M.S., 1954, Ph.D., 1958, Illinois GRAY, ROBERT S.,\* 1939 (1961), Associate Professor of Drama; B.A., 1936, M.A., 1938, Washington

GRAYSTON, J. THOMAS,\* 1960, Professor of Epidemiology and International Health; Vice President for Health Affairs; B.S., 1947, M.D., 1948, M.S., 1952, Chicago

GREEN, EVELYN, 1967 (1971), Assistant Professor of Drama; B.A., 1940, Barnard

GREEN, JOHN R., 1966 (1967), Assistant Professor of Neurological Surgery; Director, Seizure Clinic; M.D., 1961, Chicago

GREEN, WILLIAM L., 1969, Associate Professor of Medicine; A.B., 1950, M.D., 1954, Harvard

GREENGO, ROBERT E.,\* 1957 (1962), Associate Professor of Anthropology and Latin American Studies; Adjunct Curator of Burke Memorial-Washington State Museum; A.B., 1948, M.A., 1951, California (Berkeley); Ph.D., 1957, Harvard

GREENLEE, THEODORE K., JR., 1971, Associate Professor of Orthopaedics; B.S., 1956, M.D., 1959, Northwestern

GREGORY, NORMAN WAYNE,\* 1946 (1957), Professor and Chairman of Chemistry; B.S., 1940, M.S., 1941, Washington; Ph.D., 1943, Ohio State

GRESENS, RANDALL L.,\* 1965 (1970), Associate Professor of Geological Sciences; B.S., 1960, New Mexico; Ph.D., 1964, Florida State

GREY, ARTHUR L., JR.,\* 1964 (1967), Professor of Urban Planning; B.A., 1943, San Jose State; Ph.D., 1954, California (Berkeley)

GRIBANOVSKY, PAUL V.,\* 1960 (1968), Assistant Professor of Russian Language and Literature and Russian and East European Studies; B.A., 1963, M.A., 1965, Ph.D., 1968, Washington

GRIEP, ROBERT J., 1967 (1970), Assistant Professor of Medicine and Radiology; M.D., 1958, Texas

GRIFFITH, JOHN WALKER, 1968 (1969), Assistant Professor of English; B.A., 1962, New Mexico; Ph.D., 1969, Oregon

GRIFFITH, MALCOLM A.,\* 1966, Assistant Professor of English; Director of Residential Program; B.A., 1958, Oberlin; M.A., 1962, Ph.D., 1966, Ohio State

GRIFFITHS, GORDON,\* 1959 (1966), Professor of History; A.B., 1936, Ph.D., 1942, California (Berkeley); B.A., 1939, M.A., 1946, Oxford

GRIFFITHS, W. MARY, 1961 (1973), Associate Professor of Zoology; B.Sc., 1937, London; M.A., 1942, Ph.D., 1953, California (Berkeley)

GRISWOLD, MANZER JOHN,\* 1962 (1968), Associate Professor of Social Work; B.A., 1940, Montana; M.A., 1947, Ph.D., 1952, Washington

GROMAN, NEAL B.,\* 1950 (1963), Professor of Microbiology; B.S., 1947, Ph.D., 1950, Chicago

GRONDAL, BROR LEONARD, 1913 (1959), Professor Emeritus of Forest Products; B.A., 1910, Bethany (Kansas); M.S.F., 1913, Washington; D.Sc. (Hon.), 1943, Bethany; Ph.D. (Hon.), 1951, Crown Zellerbach Paper School

GROSS, EDWARD,\* 1965, Professor of Sociology; B.A., 1942, British Columbia; M.A., 1945, Toronto; Ph.D., 1949, Chicago

GROSS, VLADIMIR V., 1959 (1972), Lecturer in Russian; B.A., 1961, M.A., 1965, Washington

GROSSMAN, ARTHUR, 1968 (1971), Associate Professor of Music; Graduate, 1955, Curtis GROSSMANN, FRIEDERICH GEORG, 1967 (1968), Professor Emeritus of Art History; 1924, Vienna Faculty of Laws; Ph.D., 1931, Vienna Faculty of Philosophy

GRUMMEL, WILLIAM CHARLES,\* 1950 (1955), Associate Professor of Classics and Comparative Literature; A.B., 1937, St. Louis; A.M., 1940, Washington (St. Louis); Ph.D., 1949, New York

GRUNBAUM, BRANKO,\* 1966, Professor of Mathematics; M.Sc., 1954, Ph.D., 1957, Hebrew University

GUBERLET, MURIEL LEWIN, 1943 (1959), Assistant Professor Emeritus of English; A.B., 1910, Bethany (Kansas); A.M., 1928, Washington

GUENTHER, LOIS CATHERINE, 1973, Instructor in Maternal and Child Nursing; Diploma, 1953, King County General Hospital School of Nursing; B.S., 1970, M.N., 1971, Washington

GUEST, AVERY M.,\* 1972, Assistant Professor of Sociology; B.A., 1963, Oberlin; M.S., 1964, Columbia; M.A., 1967, Ph.D., 1970, Wisconsin

GUIDON, MICHAEL III,\* 1946 (1956), Associate Professor of Mechanical Engineering; B.S. in M.E., 1942, Lehigh; M.S. in M.E., 1952, Washington

GUILD, ROBERT E., 1960 (1970), Professor of Community Dentistry; B.S., 1948, Willamette; M.S., 1953, Ph.D., 1955, Washington

GUILFORD, EDWARD C.,\* 1959 (1973), Professor of Electrical Engineering; B.A., 1942, M.A., 1950, Utah; Ph.D., 1959, California

GUISE, EMMETT ELLERY, 1973, Assistant Professor of Education; A.B., 1962, California (Berkeley); M.Ed., 1971, Ph.D., 1973, Utah

GUNTHEROTH, WARREN G., 1958 (1969), Professor of Pediatrics; Head, Division of Pediatric Cardiology; M.D., 1952, Harvard

GUREL, MEHMET, 1972, Assistant Professor and Research Associate of Psychosocial Nursing; Diploma in Civil Engineering, 1949, Technical University of Istanbul; M.S., 1963, Case Institute of Technology; Ph.D., 1972, New York

GUY, ARTHUR W.,\* 1966 (1971), Associate Professor of Rehabilitation Medicine; B.S., 1955, M.S., 1957, Ph.D., 1966, Washington

# H

HAAG, RICHARD, 1958 (1960), Associate Professor of Landscape Architecture; B.S.L.A., 1950, M.L.A., 1952, Harvard

HAAGA, AGNES M.,\* 1947 (1966), Professor of Drama; B.A., 1936, Siena; M.A., 1952, Northwestern

HADJIMICHALAKIS, MICHAEL G.,\* 1969 (1972), Associate Professor of Economics; B.A., 1964, Athens Supreme School of Economics and Business Science; Ph.D., 1970, Rochester

HAFERKORN, VIRGINIA A., 1969 (1973), Assistant Professor of Physiological Nursing; Diploma, 1952, Sacred Heart School of Nursing, Spokane; B.S., 1956, Washington; M.S.N., 1969, California (San Francisco)

HAFERMEHL, C. LOUIS,\* 1957 (1960), Associate Professor of Art; B.A., 1940, Bethany (Kansas); M.F.A., 1955, Cranbrook Academy of Art, Michigan

HAGGLUND, ROGER M.,\* 1967 (1968), Assistant Professor of Russian Language and Literature and Russian and East European Studies; B.A., 1958, Oregon; Ph.D., 1967, Washington HAGLUND, L. KIM, 1972, Assistant Professor of Periodontics; D.D.S., 1970, McGill; M.S.D., 1972, Boston

HAGUE, WILLIAM H., 1971, Instructor in Psychiatry and Behavioral Sciences; B.A., 1959, Swarthmore; M.D., 1963, Pennsylvania

HAINER, JAMES W., 1966 (1973), Instructor in Medicine; B.A., 1962, Washington; M.D., 1966, Marquette

HAINING, ROBERT G., 1963 (1969), Instructor in Medicine; B.S., 1953, M.D., 1956, Stanford

HAKOMORI, SEN-ITIROH,\* 1968 (1971), Professor of Pathobiology and Microbiology; M.D., 1951, Tohoku (Japan); D.Med.Sci., 1956, Tohoku Imperial University

HALAR, EUGEN MARIAN, 1968, Assistant Professor of Rehabilitation Medicine; M.D., 1959, Zagreb, Yugoslavia

HALEY, CHARLES W.,\* 1966 (1971), Associate Professor of Finance; B.S.E., 1962, Michigan; M.B.A., 1964, Ph.D., 1968, Stanford

HALL, BENJAMIN D.,\* 1963 (1966), Professor of Genetics; Adjunct Professor of Biochemistry; A.B., 1954, Kansas; Ph.D., 1959, Harvard

HALL, CARRIE E.,\* 1965 (1973), Associate Professor of Epidemiology and International Health and Family and Community Nursing; Diploma, 1937, St. Joseph's School of Nursing; B.S., 1950, Syracuse; M.P.H., 1955, Minnesoia

HALL, FLORENCE TURNBULL,\* 1952 (1965), Associate Professor of Home Economics; B.S., 1943, Manitoba; M.S., 1945, Minnesota

HALL, H. EUGENE, 1963 (1969), Assistant Professor of Pathology: Chief, Pathology Service, United States Public Health Service Hospital; B.S., 1947, Prairie View A&M; M.S., 1950, M.D., 1959, Harvard

HALL, JUDITH L., 1972, Assistant Professor of Medicine and Pediatrics; B.A., 1961, Wellesley; M.S., 1965, M.D., 1966, Washington

HALL, NATHAN A.,\* 1952 (1962), Professor of Pharmacy; B.S., 1939, Ph.D., 1948, Washington

HALPERIN, WALTER,\* 1968 (1973), Associate Professor of Botany; B.A., 1954, Brown; M.S., Southern Connecticut State; Ph.D., 1965, Connecticut

HALPERN, ISAAC,\* 1953 (1960), Professor of Physics; B.S., 1943, City College, New York; Ph.D., 1948, Massachusetts Institute of Technology

HALPERN, LAWRENCE M.,\* 1965 (1969), Associate Professor of Pharmacology; B.S., 1953, Brooklyn; Ph.D., 1961, Albert Einstein College of Medicine

HALPIN, E. CARY, 1969 (1973), Assistant Professor of Restorative Dentistry; D.D.S., 1964, Marquette

HALSEY, GEORGE DAWSON,\* 1951 (1958), Professor of Chemistry; B.S., 1943, South Carolina; Ph.D., 1948, Princeton

HALVORSEN, ROBERT F., 1972 (1973), Assistant Professor of Economics; B.B.A., 1963, Michigan; M.B.A., 1965, M.P.A., 1968, Ph.D., 1973, Harvard

HAMERNYIK, PEGGY V., 1968, Lecturer in Laboratory Medicine, Division of Medical Technology; B.S., 1964, Nebraska

HAMILTON, A. IAN, 1968, Professor of Restorative Dentistry; D.D.S., 1936, Toronto; B.A., 1953, M.A., 1958, Washington; Ph.D., 1967, London

HAMILTON, FRANCIS N., 1973, Instructor in Anesthesiology; B.S., 1961, Washington; M.S., 1962, Stanford; M.D., 1966, Washington HAMILTON, GLEN W., 1967 (1971), Assistant Professor of Medicine; M.D., 1965, Washington

HAMMARLUND, E. ROY,\* 1960 (1962), Brofessor of Pharmacy; B.S., 1944, M.S., 1949, Ph.D., 1951, Washington

HAMMER, VERNON B.,\* 1947 (1962), Professor of Civil Engineering; B.S. in C.E., 1940, Washington; M.S. in S.E., 1941, Harvard

HAMMERMEISTER, KARL E., 1965 (1971), Assistant Professor of Medicine; B.S., 1960, M.D., 1964, Washington

HAMPSON, JOHN L., 1960 (1971), Professor of Psychiatry and Behavioral Sciences; A.B., 1943, Allegheny; M.D., 1946, Johns Hopkins

HANCOCK, JOHN L.,\* 1969, Associate Professor of Urban Planning; Adjunct Professor of Environmental Studies; B.A., 1954, M.A., 1955, Minnesota; Ph.D., 1964, Pennsylvania

HANEY, JACK V.,\* 1965 (1972), Associate Professor and Chairman of Slavic Languages and Literature; Associate Professor of Russian and East European Studies; B.A., 1962, Washington; B.A., 1964, M.A., 1968, D.P.hil., 1970, Oxford

HANKINS, THOMAS L.,\* 1964 (1969), Associate Professor of History; B.A., 1956, Yale; M.A.T., 1958, Harvard; Ph.D., 1964, Cornell

HANLEY, SUSAN B., 1971 (1973), Research Assistant Professor of History and East Asian Studies; B.A., 1961, Radcliffe; M.A., 1964, Ph.D., 1971, Yale

HANNEMAN, CARL F., 1967 (1969), Associate Professor of Social Work; Social Work Director, Spokane Program; B.A., 1949, Washington State; M.A., 1951, Indiana

HANSEN, SIGVARD T., JR., 1969 (1971), Assistant Professor of Orthopaedics; B.A., 1957, Whitman; M.D., 1961, Washington

HANSON, JONATHAN C., 1969 (1970), Research Associate in Biological Structure; B.S., 1963, Northwestern; Ph.D., 1969, Michigan

HANSON, KERMIT O.,\* 1948 (1954), Professor of Accounting, Finance, and Statistics; Dean, School and Graduate School of Business Administration; A.B., 1938, Luther; M.S., 1940, Ph.D., 1950, Iowa State

HANSON, LARRY G., 1969 (1970), Lecturer in Geological Sciences; M.S., 1961, Alaska; Ph.D., 1970, Washington

HANZELI, VICTOR EGON,\* 1957 (1966), Associate Professor of French Language and Literature; LL.B., 1947, Pazmany Peter University (Budapest); M.A., 1955, Ph.D., 1961, Indiana

HARDER, VIRGIL E.,\* 1955 (1967), Professor of Business Communications; B.S.C., 1950, Iowa; Ph.D., 1958, Illinois

HARDISTY, JAMES H.,\* 1970 (1972), Associate Professor of Law; A.B., 1963, LL.B., 1966, Harvard

HARGENS, LOWELL L.,\* 1969 (1971), Assistant Professor of Sociology; B.A., 1964, Minnesota; M.A., 1966, Ph.D., 1971, Wisconsin

HARING, NORRIS G.,\* 1965, Professor of Education; Adjunct Professor of Pediatrics; Director, Experimental Education Unit; A.B., 1948, Nebraska State Teachers; M.A., 1950, Nebraska; Ed.D., 1956, Syracuse

HARKER, LAURENCE A., 1966 (1971), Associate Professor of Medicine; M.D., 1960, Alberta

HARLEY, JOHN D., 1972, Instructor in Radiology; B.A., 1962, Wooster; M.D., 1966, Washington (St. Louis)

HARLOCK, SYLVIA, 1972, Instructor in Rehabilitation Medicine; B.S., 1964, Washington; M.S., 1972, San Jose State HARLOW, SHIRLEY J., 1965 (1970), Assistant Professor of Physiological Nursing; B.A.Ed., 1948, B.S., 1951, Oregon; M.A., 1965, New York

HARMAN, R. ALEC,\* 1966 (1967), Professor of Music; A.R.C.M., G.R., S.M., 1943-49, Royal Academy; B.Mus., Dunelun

HARMON, DANIEL P.,\* 1967, Assistant Professor of Classics; B.A., 1962, Loyola (Chicago); M.A., 1965, Ph.D., 1968, Northwestern

HARRINGTON, DONAL F., 1938 (1952), Professor Emeritus of Drama; A.B., 1928, Montana; M.A., 1933, Columbia

HARRINGTON, GERALD W.,\* 1969 (1973), Associate Professor of Endodontics; D.D.S., 1959, St. Louis; M.S.D., 1969, Washington

HARRIS, A. BASIL, 1967 (1973), Associate Professor of Neurological Surgery; B.A., 1950, Birmingham Southern; M.D., 1954, Alabama

HARRIS, EDISON DAVIS,<sup>\*</sup> 1947, Associate Professor of Music; B.S., 1942, New York

HARRIS, FREDRIC A.,\* 1966 (1970), Research Assistant Professor of Physiology and Biophysics; B.A., 1960, Northwestern; Ph.D., 1967, Washington

HARRIS, JAY H.,\* 1966 (1970), Associate Professor of Electrical Engineering; B.E.E., 1958, Polytechnic Institute of Brooklyn; M.S., 1959, California Institute of Technology; Ph.D., 1965, California (Los Angeles)

HARRIS, MARKHAM,\* 1946 (1970), Professor of English; A.B., 1929, M.A., 1931, Williams

HARRIS, WARD E., 1969 (1971), Research Instructor in Medicine; B.S., 1962, Ph.D., 1967, Oregon State

HARRISON, ARTHUR ELLIOT, 1948 (1973), Professor Emeritus of Electrical Engineering; B.S. in E.E., 1936, California; M.S., 1937, Ph.D., 1940, California Institute of Technology

HARSCH, ALFRED, 1930 (1967), Professor Emeritus of Law; A.B., 1926, LL.B., 1928, Washington; LL.M., 1940, Columbia

HART, DAVID K.,\* 1968 (1971), Associate Professor of Business, Government, and Society; B.S., 1957, Brigham Young; M.A., 1960, California (Berkeley); Ph.D., 1965, Claremont

HARTHORNE, FRANCIS J., 1974 (1973), Instructor in Oral Diagnosis; D.D.S., 1971, Washington

HARTMAN, RICHARD C.,\* 1971, Assistant Professor of Economics; B.A., 1966, Michigan; M.A., 1971, Ph.D., 1971, California (Berkeley)

HARTWELL, LELAND H.,\* 1968 (1973), Professor of Genetics; B.S., 1961, California Institute of Technology; Ph.D., 1964, Massachusetts Institute of Technology

HARTZ, BILLY J.,\* 1955 (1965), Professor of Civil Engineering; B.S. in C.E., 1952, M.S. in C.E., 1954, Ph.D., 1955, California

HASCHKE, RICHARD, 1972, Assistant Professor of Anesthesiology; B.A., 1965, Texas (Austin); M.S., 1967, Ph.D., 1968, Illinois (Urbana)

HASHIMOTO, MASANORI, 1973, Assistant Professor of Economics and Public Affairs; B.A., 1965, Columbia Gollege; Ph.D., 1971, Columbia

HASKINS, EDWARD F.,\* 1966 (1972), Associate Professor of Botany; B.A., 1959, M.S., 1962, Ph.D., 1965, Minnesota

HASS, G. MICHAEL, 1971 (1972), Research Assistant Professor of Biochemistry; B.A., 1965, Northwestern; Ph.D., 1969, Duke

HATCH, MELVILLE H., 1947 (1969), Professor Emeritus of Zoology; B.A., 1919, M.A., 1921, Ph.D., 1925, Michigan

**`**...



HATFIELD, GLENN WILSON, JR.,\* 1961 (1968), Associate Professor of English; B.A., 1952, M.A., 1956, Ph.D., 1964, Ohio State

HATHEWAY, WILLIAM HOWELL,\* 1969, Associate Professor of Tropical Forestry; B.S., 1948, M.S., 1952, Chicago; M.F., 1953, Ph.D., 1956, Harvard

HATLEN, JACK B.,\* 1952 (1971), Associate Professor of Environmental Health; Director, Office of Allied Health Programs; B.S., 1949, M.S., 1958, Washington

HAUGEN, DEAN PRESTON, 1972, Lecturer in Electrical Engineering; Senior Engineer, Applied Physics Laboratory; B.S., 1959, M.S., 1963, Washington

HAUSCHKA, STEPHEN D.,\* 1966 (1967), Assistant Professor of Biochemistry; B.A., 1962, Amherst; Ph.D., 1966, Johns Hopkins

HAWK, RICHARD,\* 1968 (1971), Associate Professor of Education; B.A., 1951, B.Ed., 1952, M.Ed., 1956, Western Washington; Ed.D., 1965, Washington State

HAWKINS, NEIL M.,\* 1968 (1972), Professor of Civil Engineering; B.S., 1955, B.E., 1957, Sydney; M.S., 1959, Ph.D., 1961, Illinois

HAWTHORNE, DONALD C.,\* 1960 (1970), Professor of Genetics; B.S., 1950; M.S., 1953, Ph.D., 1955, Washington

HAY, STELLA, 1955 (1969), Associate Professor of Physiological Nursing; B.S.N.E., 1944, M.A., 1951, Minnesota

HAYDEN, ALICE HAZEL,\* 1942 (1952), Professor of Education; Ph.C., 1928, B.S., M.S., 1929, Oregon State; Ph.D., 1932, Purdue

HAYDEN, PATRICIA W., 1958 (1969), Assistant Professor of Pediatrics; Director, Congenital Defects Clinic; A.M., 1949, California; M.D., 1953, Rochester

HAYNER, NORMAN S., 1925 (1966), Professor Emeritus of Sociology; B.A., 1920, Washington; M.A., 1921, Ph.D., 1923, Chicago

HAYNES, MAXINE I., 1971 (1973), Assistant Professor of Family and Community Nursing; B.A., 1941, Washington; Diploma, 1944, Lincoln School for Nurses, New York City; M.S., 1959, California (Los Angeles)

HAZZARD, WILLIAM R., 1966 (1973), Associate Professor of Medicine; A.B., 1958, M.D., 1962, Cornell

HEALY, MICHAEL L., 1969 (1972), Research Assistant Professor of Oceanography; B.S., 1958, Ph.D., 1965, Oregon State

HEATH, LOYD C.,\* 1962 (1966), Associate Professor of Accounting; A.B., 1951, Tufts; M.B.A., 1953, Northwestern; Ph.D., 1965, California (Berkeley)

HEATH, WILLIS R., 1957 (1966), Associate Professor Emeritus of Geography; B.A., 1954, M.A., 1956, Ph.D., 1958, Washington

HEAVNER, JAMES E., 1971 (1972), Assistant Professor of Anesthesiology; D.V.M., 1968, Georgia; Ph.D., 1971, Washington

HECHTER, MICHAEL,\* 1970 (1973), Associate Professor of Sociology and African Studies; B.A., 1965, Columbia College; Ph.D., 1972, Columbia

HEDRICK, DONA L.,\* 1966 (1967), Assistant Professor of Speech; B.A., 1954, M.A., 1960, Iowa; Ph.D., 1967, Washington

HEER, NICHOLAS L.,\* 1965, Associate Professor of Near Eastern Languages and Literature (Arabic) and Near Eastern Studies; B.A., 1949, Yale; Ph.D., 1955, Princeton HEIDEGER, WILLIAM J.,\* 1957 (1970), Professor of Chemical Engineering; B.S., 1954, Carnegie Institute of Technology; M.S.E., 1955, Ph.D., 1957, Princeton

HEILMAN, ROBERT BECHTOLD,\* 1948, Professor of English; A.B., 1927, Lafayette; M.A., 1930, Ohio State; M.A., 1931, Ph.D., 1935, Harvard; Litt.D. (Hon.), 1967, Lafayette; LL.D. (Hon.), 1971, Grinnell; L.H.D. (Hon.), 1973, Kenyon

HEINEMANN, M. EDITH,\* 1954 (1964), Associate Professor of Psychosocial Nursing; B.S., 1945, Seattle University; M.A., 1954, Washington HEINITZ, EVA MARIA,\* 1950 (1966), Professor of Music; studied at State Academy of Music (Berlin)

HEINRICHS, WILLIAM L., 1967 (1972), Professor of Obstetrics and Gynecology; B.S., 1954, Southwestern State; M.D., 1958, Oklahoma

HEINS, PAUL J.,\* 1965 (1969), Associate Professor of Periodontics; D.D.S., 1962, M.S.D., 1965, Washington

HELD, EDWARD EMIL, 1951 (1963), Research Professor of Fisheries; on leave; B.A., 1941; Ph.D., 1950, California (Los Angeles)

HELLMANN, DONALD C.,\* 1967 (1972), Professor of Political Science and East Asian Studies; A.B., 1955, Princeton; M.A., 1960, Ph.D., 1964, California (Berkeley)

HELLSTROM, INGEGERD E.,\* 1966 (1972), Professor of Microbiology and Physiological Nursing; Lic.Med., 1964, Karolinska Institutet, Stockholm, Sweden

HELLSTROM, KARL ERIK,\* 1966 (1969), Professor of Pathology; B.S., 1955, M.D., 1964, Ph.D., 1964, Karolinska Institutet, Stockholm, Sweden

HELMS, WARD J.,\* 1968, Assistant Professor of Electrical Engineering and Geophysics; B.S., 1960, Washington State; M.S., 1963, Ph.D., 1968, Washington

HENDERSON, DAN FENNO,\* 1962, Professor of Law; Director, Asian Law Program; B.A., 1944, Whitman; B.A., 1945, Michigan; LL.B., 1949, Harvard; Ph.D., 1955, California (Berkeley)

HENDERSON, JOSEPH EDMONDS, 1929 (1942), Professor Emeritus of Physics; B.S., 1922, Wooster; Ph.D., 1928, Yale

HENDRICKSON, ANITA E., 1965 (1973), Associate Professor of Ophthalmology; B.A., 1957, Pacific Lutheran; Ph.D., 1964, Washington

HENLEY, ERNEST M.,\* 1954 (1961), Professor and Chairman of Physics; B.E.E., 1944, City College of New York; Ph.D., 1952, California

HENNES, ROBERT G., 1934 (1973), Professor Emeritus of Civil Engineering; B.S. in C.E., 1927, Notre Dame; M.S., 1928, Massachusetts Institute of Technology

HENNING, CHARLES N.,\* 1948 (1955), Professor of Finance and Business Economics; B.A., 1938, M.A., 1940, Ph.D., 1952, California (Los Angeles)

HENNING, DALE A.,\* 1955 (1962), Professor of Management and Organization; B.S., 1948, M.B.A., 1949, Pennsylvania; Ph.D., 1954, Illinois

HENRY, DORA P., 1960 (1972), Research Professor of Oceanography; A.B., 1925, California (Los Angeles); M.A., 1926, Ph.D., 1931, California (Berkeley)

HERMODSON, MARK A., 1969 (1972), Research Assistant Professor of Medicine and Biochemistry; B.A., 1964, St. Olaf; Ph.D., 1968, Wisconsin

HERNANDEZ, E. NORMAN, 1971, Research Assistant Professor of Electrical Engineering; Senior Engineer (Program Manager), Applied Physics Laboratory; B.S. in E.E., 1963, Massachusetts Institute of Technology; Ph.D., 1969, Maryland

HERRICK, JAMES E.,\* 1966, Associate Professor of Social Work; B.S., 1955, Wisconsin; M.S.W., 1958, California; D.S.W., 1966, Southern California

HERRIOTT, JON,\* 1969, Assistant Professor of Biochemistry; B.A., 1959, Dartmouth; Ph.D., 1967, Johns Hopkins

HERRMAN, ARTHUR PHILIP, 1923 (1937), Professor Emeritus of Architecture; B.A. in Arch., 1921, Carnegie Institute of Technology; F.A.I.A.

HERRMANN, WALTER L., 1961, Professor and Chairman of Obstetrics and Gynecology; B.Med.Sci., 1945, M.D., 1949, Geneva

HERSHBERGER, WILLIAM KENNETH,\* 1970, Assistant Professor of Fisheries; B.S., 1963, Juniata; M.S., 1965, Ph.D., 1968, Pennsylvania State

HERTLING, GUNTER H.,\* 1961 (1967), Associate Professor of Germanic Languages and Literature; B.A., 1954, M.A., 1957, Ph.D., 1963, California (Berkeley)

HERTZBERG, ABRAHAM,\* 1966, Professor of Aeronautics and Astronautics; Director, Aerospace Research Laboratory; B.S. in A.E., 1943, Virginia Polytechnic Institute; M.S. in A.E., 1949, Cornell

HESS, ALAN C.,\* 1967 (1971), Associate Professor of Business Economics; B.S., 1963, Purdue; M.S., 1967, Ph.D., 1968, Carnegie Institute of Technology

HESSEL, EUGENE A. II,\* 1967 (1971), Associate Professor of Surgery; B.A., 1957, California; M.D., 1960, California

HEWITT, EDWIN,\* 1948 (1954), Professor of Mathematics; A.B., 1940, M.A., 1941, Ph.D., 1942, Harvard

HEYWOOD, J. DAVID, 1970, Associate Professor of Laboratory Medicine; Head, Division of Hematology, A.B., 1955, Earlham; M.D., 1959, Chicago

HIBBARD, RICHARD P., 1971, Lecturer in Environmental Health; B.S., 1949, Toledo

HICKEY, BARBARA, 1973, Research Assistant Professor of Oceanography; B.S., 1967, Toronto; M.S., 1969, Ph.D., 1973, California (San Diego)

HICKEY, MAURICE J., 1956 (1973), Professor Emeritus of Oral Surgery; D.M.D., 1932, Harvard; M.D., 1937, Columbia

HICKS, DOROTHY J.,\* 1969 (1973), Associate Professor of Physiological Nursing; Diploma, 1949, Scott and White Hospital; B.S.N.E., 1955, Texas; M.N., 1968, Washington

HIEBERT, PAUL G.,\* 1972, Associate Professor of Anthropology and South Asian Studies; B.A., 1954, Tabor; M.A., 1957, M.B. Seminary; M.A., 1958, Ph.D., 1967, Minnesota

HIGBEE, JAY ANDERS, 1952 (1964), Associate Professor of Humanistic-Social Studies; B.A., 1941, Iowa; M.A., 1949, Washington; D.S.S., 1955, Syracuse

HIGGINS, ROBERT C.,\* 1967 (1971), Associate Professor of Finance; B.S., 1963, Stanford; M.B.A., 1965, Harvard; Ph.D., 1968, Stanford

HIGGS, PAUL MC CLELLAN, 1926 (1959), Associate Professor Emeritus of Physics; B.S., 1919, Washington

HIGGS, ROBERT L.,\* 1968 (1972), Associate Professor of Economics; B.A., 1965, San Francisco State; Ph.D., 1968, Johns Hopkins HILDEBRAND, GRANT,\* 1964 (1973), Professor of Architecture; B.Arch., 1957, M.Arch., 1964, Michigan

HILDEBRANDT, JACOB, 1969 (1972), Affiliate Associate Professor of Medicine and Physiology and Biophysics; B.A., 1957, M.Sc., 1960, British Columbia; Ph.D., 1966, Washington

HILDEMAN, KARL-IVAR,\* 1966, Professor of Scandinavian Languages and Literature and Comparative Literature; Filkand., 1943, Fil. mag., 1944, Fillic., 1945, Ph.D., 1950, Stockholm

HILEN, ANDREW REUBEN, JR.,\* 1945 (1959), Professor of English; B.A., 1937, Washington; Ph.D., 1943, Yale

HILL, FRANCES R., 1973, Acting Assistant Professor of Political Science and African Studies; B.A., 1966, Denver; M.A., 1967, Birmingham (England); Ph.D., 1973, Harvard

HILL, RAYMOND LEROY, 1927 (1961), Professor Emeritus of Art; Graduate, 1913, Rhode Island School of Design

HILL, ROY C., 1959 (1968), Assistant Professor of Prosthodontics; D.M.D., 1936, North Pacific

HILL, W. RYLAND,\* 1941 (1953), Professor of Electrical Engineering; Dean, College of Engineering; B.S. in E.E., 1934, Washington; M.S. in E.E., 1938, E.E., 1941, California (Berkeley)

HILL, WARREN,\* 1959 (1968), Associate Professor of Art; B.A., 1950, Washington; M.A., 1961, New York

HILLE, BERTIL,\* 1968 (1971), Associate Professor of Physiology and Biophysics; B.S., 1962, Yale; Ph.D., Rockefeller

HILLMAN, ROBERT S., 1965 (1969), Associate Professor of Medicine; Director, Health Sciences Center Office of Learning Resources; B.S., 1955, Massachusetts; M.D., 1959, New York

HILTON, PETER, 1971 (1973), Affiliate Professor of Mathematics; M.A., 1943, D.Phil., 1950, Oxford; Ph.D., 1952, Cambridge

HIRABAYASHI, RICHARD S., 1973, Assistant Professor of Education; B.A., 1956, Washington; M.Ed., 1969, Ph.D., 1973, Illinois

HIRAGA, NOBURU, 1961, Lecturer in Japanese and East Asian Studies; B.A., 1953, Denver; M.A., 1955, Washington

HIRSCHFELDER, JOHN J.,\* 1968, Assistant Professor of Mathematics; B.S., 1965, M.S., 1966, Ph.D., 1968, Notre Dame

HITCHCOCK, CHARLES LEO, 1937 (1944), Professor Emeritus of Botany; A.B., 1927, Pomona; A.M., 1929, Claremont; Ph.D., 1931, Washington (St. Louis)

HITCHNER, DELL G.,\* 1947 (1963), Professor of Political Science; B.A., 1936, Wichita; M.A., 1937, Missouri; Ph.D., 1940, Wisconsin

HIXSON, WILLIAM J.,\* 1950 (1966), Professor of Art; B.A., 1948, M.F.A., 1950, Oregon

HJORTH, ROLAND L.,\* 1964 (1969), Professor of Law; A.B., 1957, Nebraska; Fulbright Certificate, 1958, Heidelberg (Germany); LL.B., 1961, New York

HLASTALA, MICHAEL P., 1970 (1971), Research Assistant Professor of Medicine; B.S., 1966, Washington; M.D., 1969, New York

HOAG, ALBERT L.,\* 1946 (1957), Associate Professor of Civil Engineering; B.S.F., 1941, B.S. in C.E., 1952; Washington; M.S., 1973, Stanford

HOBBS, PETER V.,\* 1963 (1970), Professor of Atmospheric Sciences; Adjunct Professor of Geophysics; B.Sc., 1960, A.R.C.S., 1960, Ph.D., 1963, D.I.C., 1963; London HOBBY, CHARLES RAY,\* 1961 (1970), Professor of Mathematics; B.A., 1953, California; M.S., 1957, Houston; Ph.D., 1960, California Institute of Technology

HODGE, PAUL W.,\* 1965 (1969), Professor of Astronomy and Geophysics; B.S., 1956, Yale; Ph.D., 1960, Harvard

HODGSON, THOMAS F., 1956, Director, Evaluative and Counseling Services; B.A., 1949, British Columbia; M.S., 1952, Ph.D., 1958; Washington

HODSDON, JOHN M., 1970, Research Associate in Biological Structure; B.S., 1960, New Hampshire; M.S., 1963, Alaska; Ph.D., 1970, California (Berkeley)

HODSON, JEAN T.,\* 1952 (1969), Professor of Restorative Dentistry; B.S., 1952, M.S., 1958, Washington

HODSON, W. ALAN, 1966 (1971), Associate Professor of Pediatrics; Head, Division of Neonatal Biology; B.S., 1955, M.D., 1959, Manitoba, Canada

HOEHN, HOLGER W., 1972, Assistant Professor of Pathology; Abitur, 1962, Realgymnasium (Wurzburg); M.D., 1968, Wurzburg

HOFFMAN, ALLAN S.,\* 1970 (1973), Professor of Chemical Engineering and Bioengineering; Assistant Director for Engineering, Center for Bioengineering; B.S., 1953, M.S., 1955, Sc.D., 1957, Massachusetts Institute of Technology

HOFFMAN, KATHERINE J.,\* 1942 (1956), Professor of Maternal and Child Nursing; Assistant Vice President for Health Affairs; A.B., 1929, Puget Sound; Diploma, 1934, Tacoma General Hospital; M.N., 1941, Ph.D., 1956, Washington

HOGNESS, JOHN R., 1973, Professor of Medicine; President, University of Washington; B.S., 1943, M.D., 1946, Chicago

HOKANSON, RANDOLPH,\* 1949 (1966), Professor of Music; studied with Dame Myra Hess, Howard Ferguson (London)

HOLCENBERG, JOHN S.,\* 1967 (1971), Associate Professor of Medicine and Pharmacology; A.B., 1956, Harvard; M.D., 1961, Washington

HOLDEN, ALISTAIR D. C.,\* 1958 (1970), Associate Professor of Electrical Engineering and Computer Science; B.S., 1955, Glasgow; M.E., 1958, Yale; Ph.D., 1964, Washington –

HOLDSWORTH, NORA G., 1965 (1968), Lecturer in Russian Language; B.A., 1965, Washington

HOLIFIELD, KARL L., 1971, Lecturer in Communications; B.A., 1969, Washington; M.S., 1971, Syracuse

HOLL, JACK M.,\* 1970, Assistant Professor of History; B.A., 1959, Pacific Lutheran; M.A., 1961, Maine; Ph.D., 1969, Cornell

HOLLOWAY, G. ALLEN, JR., 1972, Instructor of Bioengineering; B.A., 1960, Yale; M.D., 1964, Harvard

HOLM, BILL,\* 1968 (1973), Associate Professor of Art History; Curator, Northwest Coast Indian Art, Thomas Burke Memorial-Washington State Museum; B.A., 1949, M.F.A., 1951, Washington

HOLM, VANJA A., 1965 (1969), Assistant Professor of Pediatrics; Med.kand., 1950, Med.lic. (M.D.), 1954, Karolinska Institute, Sweden

HOLMES, KING K., 1967 (1970), Assistant Professor of Medicine; A.B., 1959, Harvard; M.D., 1963, Cornell

HOLMES, THOMAS H., 1949 (1958), Professor of Psychiatry and Behavioral Sciences; A.B., 1939, North Carolina; M.D., 1943, Cornell HOLSAPPLE, KEITH A.,\* 1966 (1973), Associate Professor of Aeronautics and Astronautics; B.S. in A.E., 1960, M.S.E., 1964, Ph.D., 1966, Washington

HOLT, RICHARD EDWIN,\* 1954 (1962), Associate Professor of Mechanical Engineering; B.S. in M.E., 1947, M.S. in Met.E., 1957, Washington

HOLT, W. STULL, 1940, Professor Emeritus of History; A.B., 1920, Cornell; Ph.D., 1926, Johns Hopkins

HOLTON, JAMES,\* 1965 (1973), Professor of Atmospheric Sciences; B.A., 1960, Harvard; Ph.D., 1964, Massachusetts Institute of Technology

HOLUB, RICHARD R., 1971, Research Associate of Environmental Health; B.S., 1969, Washington; M.S., 1970, California (Berkeley)

HONGLADAROM, THAWORN, 1971, Instructor in Rehabilitation Medicine; M.D., 1964, Washington

HOOLEY, JAMES R.,\* 1963 (1972), Professor of Oral Surgery; Chairman, Department of Oral Surgery; D.D.S., 1957, St. Louis

HOOPLE, SHEILA F., 1967 (1969), Instructor in Dental Hygiene; B.S., R.D.H., 1964, Washington

HOOVER, J. JOANNE, 1972, Assistant Professor of Epidemiology and International Health; B.S., 1958, M.D., 1960, Illinois; M.P.H., 1972, Washington

HOOVER, PHYLLIS M., 1973, Research Associate in Psychosocial Nursing; B.S., 1964, M.N., Montana State

HOPKINS, WILLIAM S., 1946, Professor Emeritus of Economics; B.S., 1925, M.A., 1928, Oregon; Ph.D., 1932, Stanford

HOPP, RAIMONDA MODIANO, 1973, Assistant Professor of English; Diploma, 1968, University of Bucharest; M.A., 1972, Ph.D., 1973, California (San Diego)

HORITA, AKIRA,\* 1954 (1966), Professor and Acting Chairman of Pharmacology; B.A., 1950, M.S., 1951, Ph.D., 1954, Washington

HORNBEIN, THOMAS F.,\* 1963 (1970), Professor of Anesthesiology and Physiology and Biophysics; Vice Chairman, Department of Anesthesiology; B.A., 1952, Colorado; M.D., 1956, Washington (St. Louis)

HORNE, DORTHALEE BELLE, 1944 (1965), Associate Professor Emeritus of Physical Education; B.S., 1930, Missouri; M.S., 1939, Oregon

HOROWITZ, RUTH L., 1971, Assistant Professor of Political Science; B.A., 1967, M.A., 1968, Ph.D., 1972, Washington (St. Louis)

HORST, A. PAUL, 1947, Professor Emeritus of Psychology; A.B., 1927, California; Ph.D., 1931, Chicago

HORTON, GEORGE P., 1934, Associate Professor Emeritus of Psychology; B.S., 1926, M.A., 1930, Ph.D., 1932, Princeton

HORTON, WILLIAM G., 1970, Assistant Professor of Anesthesiology; Acting Chief, Pulmonary Therapy, Harborview Medical Center; B.A., 1956, Cornell; M.D., 1961; New York

HORWOOD, EDGAR M.,\* 1946 (1966), Professor of Civil Engineering and Urban Planning; B.S. in M.E., 1942, Georgia Institute of Technology; M.S. in Regional Planning, 1951, Washington; Ph.D., 1959, Pennsylvania

HOUZE, ROBERT A., JR.,\* 1972, Assistant Professor of Atmospheric Sciences; B.S., 1967, Texas A&M; S.M., 1969, Ph.D., 1972, Massachusetts Institute of Technology



HOVIS, WATSON B., 1969, Assistant Professor of Physical Education; B.A., 1955, Willamette; M.S., 1959, Illinois; Ph.D., 1969, Washington

HOWARD, DARLENE K., 1970, Instructor in Dental Hygiene; B.S., 1968, Washington

HRUBY, ANTONIN,\* 1961 (1968), Professor of Germanics and Comparative Literature; Matura, 1938, Vienna; Ph.D., 1946, Prague; Licence ès Lettres, 1950, Clermont

HRUBY, SARKA, 1971, Senior Research Associate in Pathology; Chemical Engineering Diplomate, 1947, University of Technical Sciences, Prague

HRUTFIORD, BJORN FREDERICK,\* 1965 (1969), Associate Professor of Wood Chemistry; B.S., 1954, Washington State; Ph.D., 1959, North Carolina

HSU, CHIH-CHI,\* 1958 (1971), Professor of Electrical Engineering; B.S. in E.E., 1945, Chiao-Tung University; M.S. in E.E., 1949, Michigan; Ph.D., 1951, Ohio State

HUANG, LEE-YUAN, 1973, Research Assistant Professor of Periodontics; B.S., 1965, Nat. Taiwan; M.S., 1968, Ph.D., 1969, Wisconsin

HUANG, THOMAS W., 1971 (1973), Assistant Professor of Pathology; M.D., 1962, College of Medicine, National Taiwan University; Ph.D., 1973, Washington

HUBER, J. RICHARD,\* 1939 (1949), Professor of Economics; B.A., 1931, Wooster; M.A., 1933, Ph.D., 1937, Princeton

HUDSON, DONALD G., 1951, Professor Emeritus of Geography; Ph.B., 1925, M.A., 1926, Ph.D., 1934, Chicago

HUDSON, LEONARD D., 1968 (1973), Assistant Professor of Medicine; B.S., 1960, Washington State; M.D., 1964, Washington

HUDSON, LOIS P., 1969, Assistant Professor of English; A.B., 1949, Puget Sound; A.M., 1951, Cornell; D. Litt. (Hon.), 1965, North Dakota State

HUGHES, ERIC LESTER,\* 1951 (1968), Professor of Physical Education; B.S., 1947, M.S., 1948, Illinois; D.Ed., 1956, Washington

HUITRIC, ALAIN C.,\* 1955 (1964), Professor of Pharmaceutical Chemistry; B.S., 1950, Loyola; M.S., 1952, Ph.D., 1954, California

HUNGERFORD, THOMAS W.,\* 1963 (1968), Associate Professor of Mathematics; A.B., 1958, Holy Cross; M.S., 1960, Ph.D., 1963, Chicago

HUNKINS, FRANCIS P.,\* 1966 (1973), Professor of Education; B.S., 1960, Salem State; M.Ed., 1963, Boston; Ph.D., 1966, Kent State

HUNN, EUGENE S., 1972 (1973), Assistant Professor of Anthropology and Latin American Studies; B.A., 1964, Stanford; M.A., 1969, Ph.D., 1973, California (Berkeley)

HUNT, EARL,\* 1966 (1971), Professor of Psychology and Computer Science; Chairman, Department of Psychology; B.A., 1954, Stanford; Ph.D., 1960, Yale

HUNT, ROBERT S.,\* 1966, Professor of Law; Associate Dean, School of Law; A.B., 1939, Oberlin; A.M., 1940, Harvard; LL.B., 1947, Yale; S.J.D., 1952, Wisconsin

HUNTSMAN, LEE L., 1968 (1973), Research Associate Professor of Mechanical Engineering; B.S., 1963, Stanford; Ph.D., 1968, Pennsylvania

HURD, WILLIAM A., 1969 (1971), Assistant Professor of Education; B.S., 1950, M.S., 1962, Tennessee State

HUSTON, JOHN C.,\* 1967, Professor of Law; B.A., 1950, J.D., 1952, Washington; LL.M., 1955, New York HUTCHINS, TROVA K.,\* 1971, Assistant Professor of Social Work; Acting Director, Undergraduate Program in Social Welfare; B.A., 1966, Whitman; M.S.W., 1968, Washington'

HUTTON, ROBERT S.,\* 1971, Assistant Professor of Physical Education; Adjunct Assistant Professor of Psychology; B.S., 1963, M.S., 1964, California (Los Angeles); Ph.D., 1969, Southern California

#### I

IGLITZIN, ALAN, 1966, Lecturer in Music; B.A., 1953, Long Island

ILLG, PAUL L.,\* 1952 (1959), Professor of Zoology; A.B., 1936, M.A., 1941, California (Berkeley); Ph.D., 1952, George Washington

INGALLS, ROBERT LYNN,\* 1966 (1969), Associate Professor of Physics; B.S., 1956, Washington; M.S., 1960, Ph.D., 1962, Carnegie Institute of Technology

INNES, BARBARA S., 1969 (1973), Assistant Professor of Physiological Nursing; B.S.N., 1963, Washington; M.S., 1969, California (San Francisco)

IRBY, DAVID M., 1972, Research Associate in Medicine and Office of Research in Medical Education; B.A., 1966, Graceland; M.Div., 1970, Union Theological Seminary

IRISH, JAMES D., 1972, Research Assistant Professor of Oceanography; B.S., 1967, Antioch; M.S., 1969, Ph.D., 1971, California (San Diego)

IRMSCHER, WILLIAM FREDERICK;\* 1960 (1966), Professor of English; Director, Freshman English; B.A., 1941, Louisville; M.A., 1947, Chicago; Ph.D., 1950, Indiana

IRVINE, DEMAR BUEL,\* 1937 (1960), Professor of Music; B.A., 1929, M.A., 1931, California (Berkeley); Ph.D., 1937, Harvard

ISHIMARU, AKIRA,\* 1958 (1965), Professor of Electrical Engineering; B.S. in E.E., 1951, Tokyo; Ph.D., 1958, Washington

ISHISAKA, ANTHONY HIDEKI,\* 1971, Assistant Professor of Social Work; B.A., 1966, M.S.W., 1968, California (Berkeley)

ISLAND, D. DAVID,\* 1967 (1970), Associate Professor of Education; B.S., 1957, Portland State; M.A., 1964, Ph.D., 1966, Minnesota

ITO, CYRIL S., 1966 (1971), Research Associate in Physiology and Biophysics; B.S., 1954, Purdue; B.S., 1959, Ph.D., 1966, Washington

IVEY, MARIANNE, 1971 (1972), Assistant Professor of Pharmacy; B.S., 1967, Wisconsin

IZUTSU, KENNETH T., 1971 (1973), Research Assistant Professor of Oral Biology; B.S., 1964, Ph.C., Ph.D., 1970, Washington

#### J

JACKSON, BRUCE, 1973, Instructor in Environmental Health; B.S., 1964, Ferris State; M.S., 1973, Washington

JACKSON, KATHLEEN O., 1971 (1972), Assistant Professor of Health Services; B.A., 1965, Colorado State; M.A., 1967, Ph.D., 1971, Oregon

JACKSON, KENNETH L.,\* 1963 (1968), Associate Professor of Radiology; A.B., 1949, Ph.D., 1954. California (Berkeley)

JACKSON, W. A. DOUGLAS,\* 1955 (1960), Professor of Geography and Russian and East European Studies; B.A., 1946, M.A., 1948, Toronto; Ph.D., 1952, Maryland JACOB, NANCY L.,\* 1970 (1973), Associate Professor of Finance and Quantitative Methods; B.A., 1967, Washington; Ph.D., 1970, California (Irvine)

JACOBS, LONA, 1972, Instructor in Dental Hygiene; B.S., 1956, Washington

JACOBS, SUE-ELLEN, 1974, Acting Associate Professor of Anthropology; Director, Women's Studies; B.A., 1963, Adams State; M.A., 1966, Ph.D., 1970, Colorado

JACOBSEN, THEODOR S., 1928, Professor Emeritus of Astronomy; A.B., 1922, Stanford; Ph.D., 1926, California (Berkeley)

JACOBSON, BERTHE PONCY, 1937 (1948), Professor Emeritus of Music; Diplomas, 1915, Conservatory of Music (Geneva); Diplomas, 1917, Schola Cantorum (Paris); Diplomas, 1921, Dalcroze School (Geneva)

JACOBSON, F. LLOYD,\* 1950, Associate Professor of Restorative Dentistry; D.M.D., 1934, Oregon

JACOBSON, PHILLIP L.,\* 1962 (1970), Professor of Architecture; B.Arch.E., 1952, Washington State; M.Arch., 1969, Finnish Institute of Technology (Helsinki)

JAFFEE, BENSON,\* 1967, Associate Professor of Social Work; B.A., 1947, M.S.W., 1953, Michigan; D.S.W., 1972, Columbia

JAMES, JENNIFER, 1971 (1973), Assistant Professor of Psychiatry and Behavioral Sciences; B.A., 1965, M.A., 1967, Washington State; Ph.D., 1972, Washington

JAMIESON, JOHN D., Major, United States Army, 1971, Assistant Professor of Military Science; B.S., 1964, Industrial Management, Oregon; M.P.A., 1974, Washington

JANS, JAMES P.,\* 1957 (1964), Professor of Mathematics; A.B., 1949, M.A., 1950, Ph.D., 1955, Michigan

JAROLIMEK, JOHN,<sup>\*</sup> 1962 (1965), Professor of Education; B.S., 1943, Wisconsin State; M.A., 1949, Ph.D., 1955, Minnesota

JARVI, RAYMOND R. A.,\* 1970, Assistant Professor of Scandinavian Languages and Literature; B.A., 1964, M.A., 1966, Ph.D., 1970, Washington

JAYNE, BENJAMIN ANDERSON,\* 1966 (1972), Professor of Fisheries and Forest Resources; Director, Center for Quantitative Science in Forestry, Fisheries, and Wildlife Management; Adjunct Professor of Environmental Studies; B.S.F., 1953, Idaho; M.F., 1953, D.F., 1955, Yale

JENKINS, PAUL R.,\* 1964 (1970), Associate Professor of Art; B.F.A., 1962, Chicago Art Institute; M.F.A., 1964, Michigan

JENSEN, ALFRED, 1930 (1956), Professor Emeritus of Architectural Engineering; B.S. in C.E., 1925, M.S. in C.E., 1932, Washington

JENSEN, LYLE H.,\* 1947 (1961), Professor of Biological Structure; A.B., 1939, Walla Walla; Ph.D., 1943, Washington

JOHANSON, LENNART N.,\* 1951 (1962), Professor of Chemical Engineering; B.S., 1942, Utah; M.S., 1943, Ph.D., 1948, Wisconsin

JOHNSEN, STANLEY DAVID, 1972, Assistant Professor in Pediatrics; B.S., 1959, M.S., 1963, M.D., 1963, Wisconsin

JOHNSON, A. DOROTHEA, 1966, Research Associate in Oral Biology; B.S., 1964, Washington

JOHNSON, DAVID G., 1971 (1973), Assistant Professor of Medicine; B.A., 1962, Yale; B.Md. Sci., 1964, Dartmouth; M.D., 1967, Harvard JOHNSON, DAVID L.,\* 1955 (1961), Professor of Electrical Engineering and Computer Science; B.S. in E.E., 1948, Idaho; Ph.D., 1955, Purdue

JOHNSON, DUDLEY W.,\* 1960 (1966), Professor of Finance and Business Economics; B.A., 1950, Pacific University; M.A., 1953, Ph.D., 1957, Northwestern

JOHNSON, EDWARD J., Major, United States Army, 1973, Assistant Professor of Military Science; B.B.A., 1970, Texas

JOHNSON, FLETCHER O., 1950 (1969), Lecturer Emeritus in Accounting; B.B.A., 1924, Washington; C.P.A., 1925, State of Washington (Pennsylvania, California, Illinois)

JOHNSON, HAROLD H.,\* 1961 (1964), Associate Professor of Mathematics; B.A., 1951, San Jose State; M.A., 1956, Ph.D., 1957, California (Berkeley)

JOHNSON, HOWARD M., 1970 (1972), Assistant Professor of Education; B.A., 1959, Kansas; M.A.T., 1960, Ed.D., 1965, Harvard

JOHNSON, MARVIN A., 1958 (1972), Assistant Professor of Restorative Dentistry; B.S., 1949, D.D.S., 1952, Washington

JOHNSON, MARY LOUISE,\* 1945 (1957), Professor of Home Economics; Director, School of Home Economics; B.A., 1940, Hardin-Simmons; M.S., 1942, Wisconsin; M.S., 1953, D.Sc., 1954, Harvard

JOHNSON, MERLIN H., 1955 (1971), Professor of Psychiatry and Behavioral Sciences; B.A., 1944, M.D., 1947, Iowa

JOHNSON, PAULINE,\* 1941 (1958), Professor of Art; B.A., 1929, Washington; M.A., 1936, Columbia

JOHNSON, RALPH W.,\* 1955 (1961), Professor of Law; Adjunct Professor of Environmental Studies; Diploma, 1945, Lehigh; B.S., 1947, LL.B., 1949, Oregon

JOHNSON, RICHARD A.,\* 1955 (1965), Professor of Operations Management; B.B.A., 1949, M.B.A., 1952, Minnesota; Ph.D., 1958, Washington

JOHNSON, RICHARD R., 1972 (1973), Assistant Professor of History; B.A., 1964, Oxford; M.A., 1965, Ph.D., 1972, California

JOHNSON, STEPHEN L., 1971, Assistant Professor of Medicine and Bioengineering; B.S., 1957, Massachusetts Institute of Technology; A.B., 1960, M.D., 1964, Washington

JOHNSON, WALTER G., 1948 (1956), Professor Emeritus of Scandinavian Languages and Comparative Literature; B.A., 1927, Augsburg; M.A., 1929; Minnesota; Ph.D., 1935, Illinois

JOHNSTON, NORMAN J.,\* 1960 (1964), Professor of Architecture and Urban Planning; Associate Dean, College of Architecture and Urban Planning; B.A., 1942, Washington; B.Arch., 1949, Oregon; M.C.P., 1959, Ph.D., 1964, Pennsylvania

JOHNSTON, WILLIAM F., 1969, Associate Professor of Communications; B.A., 1941, Litt.D., 1966, Idaho

JONES, EDWARD LOUIS, 1968, Lecturer in Education; Academic Counselor, College of Arts and Sciences; B.A., 1952, 1955, Washington; Jur.D., 1963, Gonzaga

JONES, FRANK WILLIAM,\* 1955 (1970), Professor of English and Comparative Literature; B.A., 1934, Manitoba; Ph.D., 1941, Wisconsin; B.A., M.A., 1955, Oxford

JONES, JOHN H.,\* 1969, Assistant Professor of Metallurgical Engineering; B.S. in Met.E., 1964, M.S. in Met.E., 1967, Ph.D. (Met.E.), 1969, Colorado School of Mines JONES, LOUISA,\* 1968, Assistant Professor of French Language and Literature and Comparative Literature; B.A., 1963, Dalhousie, Halifax; M.A., 1966, Alberta; Ph.D., 1968, Illinois

JONES, MARY C.,\* 1964 (1969), Assistant Professor of Family and Community Nursing; B.S., 1943, Washington; M.S., 1962, Boston

JONES, ROBERT,\* 1960 (1967), Associate Professor of Art; B.F.A., 1953, M.S., 1959, Rhode Island School of Design

JOONDEPH, DONALD R.,\* 1969 (1971), Assistant Professor of Orthodontics; B.S., D.D.S., 1967, M.S., 1969, Northwestern

JOPLIN, CLAIRE, 1972, Research Associate in Biostatistics; B.A., 1969, California

JOPPA, ROBERT GLENN,\* 1947 (1970), Professor of Aeronautics and Astronautics; B.S. in A.E., 1945, M.S. in A.E., 1951, Washington; M.A., 1962, Ph.D., 1972, Princeton

JORGENSEN, JENS ERIK,\* 1968 (1973), Associate Professor of Mechanical Engineering; S.B. in M.E., 1959, S.M. in M.E., 1963, Sc.D., 1969, Massachusetts Institute of Technology

JUCHAU, MONT R.,\* 1969 (1973), Associate Professor of Pharmacology; B.S., 1960, Idaho State; M.S., 1963, Washington State; Ph.D., 1966, Iowa

JUNKER, JOHN M.,\* 1964 (1970), Professor of Law; B.A., 1959, Washington State; J.D., 1962, Chicago

JUNO, PHILIP, 1973, Instructor in Anesthesiology; M.B., B.S., 1966, Melbourne, Australia

JUSSILA, CLYDE FILMORE, 1971, Associate Professor of Music; Adjunct Associate Professor of Education; B.A., 1949, Washington; M.S., 1951, Kansas

### K

KAKIUCHI, GEORGE H.,\* 1957 (1968), Associate Professor of Geography and East and South Asian Studies; A.B., 1952, M.A., 1953, Ph.D., 1957, Michigan

KALINA, ROBERT E., 1967 (1972), Professor and Chairman of Ophthalmology; B.A., 1957, M.D., 1960, Minnesota

KALTSOUNIS, THEODORE,\* 1968 (1971), Professor of Education; B.A., 1956, McPherson; M.A., 1959, Wichita; Ph.D., 1961, Illinois

KAMINSKY, HOWARD,\* 1957 (1968), Professor of History; M.A., 1949, Ph.D., 1952, Chicago

KANAREK, PAULA, 1972, Assistant Professor of Biostatistics; B.S., 1967, Michigan; M.S., 1969, D.Sc., 1973, Harvard

KAO, GRACE F. Y., 1972, Research Associate in Pathology; Staff Pathologist, United States Public Health Service Hospital; M.B., 1967, National Taiwan University

KAPETANIC, DAVOR,\* 1972, Associate Professor of Serbo-Croatian Language and Literature and Russian and East European Studies; M.A., 1954, D.Sc., 1972, University of Zagreb

KAPLAN, ALEX,\* 1960 (1969), Professor of Laboratory Medicine and Biochemistry; Head, Division of Clinical Chemistry; A.B., 1932, California (Los Angeles); Ph.D., 1936, California

KAPLAN, DAVID M.,\* 1973, Assistant Professor of Environmental Health; B.S., 1963, Cornell; Ph.D., 1968, Oregon

KAPLAN, SYDNEY JANET, 1971, Assistant Professor of English; A.B., 1961, M.A., 1966, Ph.D., 1971, California (Los Angeles) KAPP, ROBERT A.,\* 1973, Assistant Professor of History and East Asian Studies; B.A., 1964, Swarthmore; M.A., 1966, Ph.D., 1970, Yale

KARIYA, BEVERLY KIMIKO, 1972 (1973), Research Associate in Pathology; B.S., 1965, Washington

KARP, LAURENCE E., 1972, Assistant Professor of Obstetrics and Gynecology; B.S., 1959, Rutgers; M.D., 1963, New York

KARTIGANER, DONALD M.,\* 1964\_(1970), Associate Professor of English; A.B., 1959, Brown; M.A., 1960, Columbia; Ph.D., 1964, Brown

KASHIWA, HERBERT K.,\* 1966 (1971), Associate Professor of Biological Structure; B.S., 1950, Hawaii; M.S., 1954, Ph.D., 1960, George Washington

KAST, FREMONT E.,\* 1951 (1961), Professor of Management and Organization; A.B., 1946, San Jose State; M.B.A., 1949, Stanford; Ph.D., 1956, Washington

KATZ, DORIS M.,\* 1969, Assistant Professor of Home Economics; B.S., 1941, M.S., 1943, Wisconsin

KATZ, SOLOMON,\* 1936 (1950), Professor of History; Vice President for Academic Affairs and Provost; A.B., 1930, Ph.D., 1933, Cornell

KAUFFMAN, DOROTHY L., 1968, Research Associate in Oral Biology; B.A., 1950, Gustavus Adolphus

KAUFFMAN, ROBERT,\* 1968 (1970), Assistant Professor of Music and African Studies; B.Mus., 1951, Bethany; M.M., 1953, Indiana

KAUFMAN, HELEN ANDREWS, 1930 (1959), Professor Emeritus of English; Research Consultant; B.A., 1909, Wilson; M.A., 1911, Indiana; Ph.D., 1934, Washington

KAWABORI, ISAMU, 1973, Instructor in Pediatrics; B.A., 1962, Occidental; M.D., 1966, Washington

KEATING, JOHN P.,\* 1972, Assistant Professor of Psychology; B.A., 1961, M.A., 1962, Gonzaga; M.A., 1969, Santa Clara; M.A., 1971, Ph.D., 1972, Ohio State

KECHLEY, GERALD,\* 1953 (1967), Professor of Music; B.A., 1946, M.A., 1950, Washington

KEHL, RICHARD,\* 1968, Assistant Professor of Art; B.F.A., 1959, M.F.A., 1961, Kansas City Art Institute

KEHL, THEODORE H.,\* 1961 (1968), Associate Professor of Physiology and Biophysics and Computer Science; B.S., 1956, M.S., 1958, Ph.D., 1961, Wisconsin

KELLER, ABRAHAM C.,\* 1948 (1964), Professor of French Language and Literature; B.A., 1936, M.A., 1937, Ohio State; Ph.D., 1946, California (Berkeley)

KELLER, JACK, 1964 (1967), Assistant Professor of Orthodontics; D.D.S., 1960, M.S.D., 1965, Washington

KELLER, JOHN M.,\* 1970, Assistant Professor of Biochemistry; A.B., 1961, Princeton; Ph.D., 1966, Massachusetts Institute of Technology

KELLER, PATRICIA J.,\* 1963 (1967), Professor of Oral Biology; Associate Dean, Graduate School; B.S., 1945, Detroit; Ph.D., 1953, Washington (St. Louis)

KELLEY, CHARLES,\* 1964, Professor of Architecture; B.Arch., 1942, Alabama Polytechnic Institute; M.A., 1952, Harvard

KELLEY, JAMES C.,\* 1966 (1972), Associate Professor of Oceanography and Geological Sciences; B.A., 1963, Pomona; Ph.D., 1966, Wyoming

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KELLEY, LOIS M., 1973, Research Instructor in Forest Resources; B.S., 1968, M.A., 1971, M.S., 1973, Washington

KELLEY, LUCILLE M., 1973, Instructor in Psychosocial Nursing; Diploma, 1954, St. Vincent's Hospital; B.S., 1969, Connecticut; M.N., 1973, Washington

KELLEY, VINCENT C., 1958, Professor of Pediatrics; Head, Division of Endocrinology; B.A., 1934, M.S., 1935, North Dakota; B.S., 1936, Ph.D., 1942, B.S., 1944, M.B., 1945, M.D., 1946, Minnesota

KELLOGG, CAROLYN J., 1971, Instructor in Physiological Nursing; B.S.N., 1968, M.S., 1970, Michigan

KELLY, SAMUEL E., 1972, Associate Professor of Education; Vice President for Minority Affairs; B.A., 1959, West Virginia State; M.A., 1960, Marshall; B.S., 1963, West Virginia State; Ph.D., 1971, Washington

KELLY, WILLIAM A., 1959 (1970), Associate Professor of Neurological Surgery; B.A., 1950, Ohio Wesleyan; M.D., 1954, Cincinnati

KENADY, REID MONCREIF, JR., 1968, Lecturer in Forest Resources; B.S.F., 1959, M.F., 1962, Washington

KENNAR, MARILYN, 1960, Instructor in Dental Hygiene; B.S., R.D.H., 1959, Washington

KENNEDY, J. WARD, 1966 (1971), Associate Professor of Medicine; B.A., 1955, Bowdoin; M.D., 1959, Rochester

KENNEDY, ROSS D., 1972, Assistant Professor of Anesthesiology; B.A., 1961, Whitman; M.D., 1965, Washington

KENNEDY, THELMA T.,\* 1958 (1972), Professor of Physiology and Biophysics; Ph.B., B.S., 1947, M.S., 1949, Ph.D., 1955, Chicago

KENNEDY, WILLIAM F., JR., 1965 (1970), Associate Professor of Anesthesiology; Chief, Anesthesiology, University Hospital; B.S., 1952, Bates; M.D., 1957, Maryland

KENNY, GEORGE E., 1961 (1971), Professor and Chairman of Pathobiology; Adjunct Professor of Microbiology; B.S., 1952, Fordham; M.S., 1957, North Dakota; Ph.D., 1961, Minnesota

KENNY, MARGARET A., 1970 (1972), Assistant Professor of Laboratory Medicine; Associate Director, Divisions of Chemistry and Immunology; B.S., 1962, Portland; Ph.D., 1967, Illinois

KENT, JOSEPH C.,\* 1952 (1961), Associate Professor of Civil Engineering; B.S. in C.E., 1945, British Columbia; M.S. in C.E., 1948, Stanford; Ph.D., 1952, California

KENWORTHY, RAY WILLIAM, 1929 (1950), Associate Professor Emeritus of Physics; B.A., 1924, M.S., 1925, Iowa; Ph.D., 1938, Washington

KERR, DONNA H., 1973, Assistant Professor of Education; B.A., 1965, Kansas; Ph.D., 1973, Columbia

KERSH, MILDRED E.,\* 1969, Assistant Professor of Education; B.S., 1961, Loyola; M.A., 1965, Louisiana State; Ph.D., 1971, Chicago

KEVORKIAN, JIRAIR,\* 1964 (1971), Professor of Aeronautics and Astronautics; B.S. in A.E., 1955, M.S. in A.E., 1956, Georgia Institute of Technology; Ph.D., 1961, California Institute of Technology

KEYES, CHARLES F.,\* 1965 (1969), Associate Professor of Anthropology; B.A., 1959, Nebraska; Ph.D., 1967, Cornell

KEYT, DAVID,\* 1957 (1969), Professor and Chairman of Philosophy; A.B., 1951, Kenyon; M.A., 1953, Ph.D., 1955, Cornell KIDWELL, M. KATHRO, 1939, Associate Professor Emeritus of Physical Education; B.S., 1927, Nebraska; M.S., 1928, Wisconsin; Ed.D., 1954, Columbia

KIEHN, E. DONALD, 1973, Assistant Professor of Microbiology; B.S., 1965, Washington; Ph.D., 1970, California (Irvine)

KIELING, WILLIAM CLAYTON,\* 1956 (1964), Associate Professor of Mechanical Engineering; B.S. in M.E., 1950, M.S. in M.E., 1959, Washington

KIENAST, PHILIP K.,\* 1970, Assistant Professor of Management and Organization; B.S., 1963, Notre Dame; M.L.I.R., 1966, Ph.D., 1972, Michigan State

KILCUP, RODNEY W.,\* 1970, Assistant Professor of History; B.A., 1961, Washington; M.A., 1964, Ph.D., 1969, Harvard

KIMM, JOSEPH,\* 1968 (1970), Assistant Professor of Otolaryngology and Physiology and Biophysics; A.B., 1963, California (Santa Barbara); Ph.D., 1969, Arizona State

KIND, SILVIA E., 1969, Professor of Music; Diplomas, 1928, Zurich Conservatory; Konzert-Reife-Prufung, 1934, Hochschule fur Musik, Berlin

KING, BENJAMIN F.,\* 1972, Professor of Finance, Business Economics, and Quantitative Methods; Grant I. Butterbaugh Professor of Quantitative Methods; A.B., 1958, M.B.A., 1959, Ph.D., 1964, Chicago

KING, WEILING CHANG, 1961 (1972), Research Associate in Medicine; B.A., 1959, Mercyhurst; M.S., 1960, Illinois

KINGSBURY, MARTHA,\* 1968 (1973), Associate Professor of Art History; B.A., 1962, Chicago; M.A., 1963, Ph.D., 1969, Harvard

KINGSTON, JOHN MAURICE,\* 1940 (1959), Associate Professor of Mathematics; Executive Secretary, Department of Mathematics; B.A., 1935, Western Ontario; M.A., 1936, Ph.D., 1939, Toronto

KIPPENHAN, CHARLES JACOB,\* 1963, Professor of Mechanical Engineering; B.S. in M.E., 1940, M.S. in M.E., 1946, Ph.D., 1948, Iowa

KIRBY, JOHN F., JR., 1972, Instructor in Rehabilitation Medicine; B.A., 1962, M.D., 1966, Washington

KIRBY, WILLIAM M. M., 1949 (1955), Professor of Medicine; B.S., 1936, Trinity; M.D., 1950, Cornell

KIRK, ROBERT E.,\* 1972 (1973), Assistant Professor of Philosophy; B.S., 1963, Ph.D., 1972, Massachusetts Institute of Technology

KIRKPATRICK, GORDON SIDNEY, 1970, Research Instructor in Orthopaedics; M.S., 1967, Ph.D., 1970, Washington

KIRKPATRICK, LARRY D.,\* 1969, Assistant Professor of Physics; B.S., 1963, Washington State; Ph.D., 1968, Massachusetts Institute of Technology

KITTELL, JACK E.,\* 1964 (1968), Professor of Education; B.A., 1941, Denver; M.Ed., 1952, Central Washington; Ph.D., 1956, Washington State

KIVIAT, MARK D., 1971 (1973), Assistant Professor of Urology; A.B., 1960, Rutgers; M.D., 1964, New York (Syracuse)

KLAUSENBURGER, JURGEN,\* 1969, Assistant Professor of French Language and Literature; A.B., 1964, A.M., 1966, Ph.D., 1959, Michigan

KLEBANOFF, SEYMOUR J.,\* 1962 (1968), Professor of Medicine; Adjunct Professor of Microbiology; M.D., 1951, Toronto KLEE, VICTOR L.,\* 1953 (1957), Professor of Mathematics; B.A., 1945, Pomona; Ph.D., 1949, Virginia; D.Sc. (Hon.), 1965, Pomona

KLEINMAN, GOLDY D., 1971, Research Associate in Environmental Health; B.A., 1942, Hunter; M.A., 1946, Columbia

KLINGBEIL, KARIL S., 1969, Clinical Assistant Professor of Social Work; Director, Social Service Department, Harborview Medical Center; B.A., 1957, M.S.W., 1960, Washington

KLOCKARS, ALAN J.,\* 1967 (1971), Associate Professor of Education; B.S., 1962, M.A., 1963, Oregon State; Ph.D., 1967, Washington

KLYN, MARK STEPHEN,\* 1962 (1969), Associate Professor of Speech; B.S., 1956, M.A., 1958, Ph.D., 1966, Northwestern

KNAPP, MARY E., 1969, Instructor in Maternal and Child Nursing; B.S.N., 1967, Washington; M.S.N., 1969, California (San Francisco)

KNECHTGES, DAVID R.,\* 1972, Assistant Professor of Chinese and East Asian Studies; B.A., 1964, Washington; A.M., 1965, Harvard; Ph.D., 1968, Washington

KNOTT, RUSSELL A., 1969 (1973), Instructor in Orthopaedics; B.A., 1962, Dartmouth; M.D., 1966, Nebraska

KNOWLES, HENRY P.,\* 1957 (1971), Professor of Organizational Behavior and Administration; B.S., 1935, United States Naval Academy; M.B.A., 1947, Harvard; Ph.D., 1961, Stanford

KNUDSON, DAVID,\* 1967, Assistant Professor of Mathematics; B.A., 1961, Luther; M.S., 1964, Ph.D., 1967, Northwestern

KNUDSON, HARRY R., JR.,\* 1958 (1967), Professor of Organizational Behavior and Business Policy; B.S., 1952, M.B.A., 1953, Indiana; D.B.A., 1958, Harvard

KOBATA, DENNIS H., 1973, Assistant Professor of Endodontics; D.D.S., 1969, Southern California; M.S.D., 1973, Washington

KOBAYASHI, ALBERT SATOSHI,\* 1958 (1965), Professor of Mechanical Engineering; B.S., 1947, Tokyo; M.S. in M.E., 1952, Washington; Ph.D., 1958, Illinois Institute of Technology

KOCH, REBECCA L., 1970, Instructor in Dental Hygiene; B.S., 1969, Washington

KOCHIN, LEVIS A., 1972, Acting Assistant Professor of Economics; B.S., 1965, Temple

KOEHLER, JAMES K.,\* 1963 (1968), Associate Professor of Biological Structure; B.S., 1955, Illinois; M.S., 1957, Ph.D., 1961, California (Berkeley)

KOENIG, HAZEL,\* 1967 (1968), Associate Professor of Art Education; B.A., 1950, M.F.A., 1950, Washington

KOERKER, DONNA J., 1970 (1972), Instructor in Medicine and Physiology and Biophysics; B.S., 1961, Whitworth; Ph.D., 1970, Michigan

KOGAN, KATE L., 1956 (1972), Professor of Psychiatry and Behavioral Sciences; B.A., 1934, Wellesley; M.A., 1935, Ph.D., 1943, Columbia

KOHLBERG, IRVING J., 1971, Assistant Professor of Psychiatry and Behavioral Sciences and Pediatrics; B.S., 1960, M.D., 1963, Wisconsin

KOHLENBERG, ROBERT J.,\* 1968, Assistant Professor of Psychology; B.S., 1961, Milwaukee School of Engineering; M.S., 1963, Wisconsin; Ph.D., 1968, California (Los Angeles)

KOHN, ALAN J.,\* 1961 (1967), Professor of Zoology; Assistant Chairman, Department of Zoology; Adjunct Curator in Malacology, Burke Memorial-Washington State Museum; A.B., 1953, Princeton; Ph.D., 1957, Yale KOLB, KEITH,\* 1952, Associate Professor of Architecture; B.Arch., 1947, Washington; M.Arch., 1950, Harvard

KOLDE, ENDEL J.,\* 1951 (1959), Professor of International Business and Marketing; B.S., 1940, National Military Academy (Estonia); D.H.S., 1947, Stockholm; M.A., 1951, Ph.D., 1954, Washington

KOLPACOFF, VICTOR IVAN, 1973, Assistant Professor of English; A.B., 1962, San Diego State; M.A., 1966, San Francisco State

KONICHEK, DORLAND H., 1954 (1973), Associate Professor Emeritus of General Engineering; B.S. in C.E., 1930, North Dakota State

KONICK, WILLIS A.,\* 1961 (1973), Associate Professor of Russian Language and Literature, Comparative Literature, and Russian and East European Studies; B.A., 1951, M.A., 1954, Ph.D., 1964, Washington

KOPLITZ, R. MARLENE, 1967, Associate in Pathology; B.S., 1956, Washington

KORG, JACOB,\* 1955 (1966), Professor of English; B.A., 1948, City College, New York; M.A., 1947, Ph.D., 1952, Columbia

KORMANIK, JOSEPH D., 1971, Assistant Professor of Aerospace Studies; B.A., 1959, Akron; M.B.A., 1968, Kent State

KOTTLER, HOWARD,\* 1964 (1972), Professor of Art; B.A., 1952, M.A., 1956, Ohio State; M.F.A., 1957, Cranbrook Academy of Art, Michigan; Ph.D., 1964, Ohio State

KOWALSKI, BRUCE RICHARD, 1973, Assistant Professor of Chemistry; B.A., 1965, Millikin; Ph.D., 1969, Washington

KOZLOFF, EUGENE N.,\* 1961 (1968), Professor of Zoology; A.B., 1942, M.A., 1946, Ph.D., 1950, California (Berkeley)

KOZLOWSKI, GEORGE A.,\* 1969, Assistant Professor of Mathematics; B.A., 1963, Wesleyan; Ph.D., 1968, Michigan

KRACHMALNICK, SAMUEL, 1971, Professor of Music; Director of Symphony and Opera; Diploma, 1952, Juilliard

KRADJAN, WAYNE,\* 1971 (1972), Assistant Professor of Pharmacy; Pharm D., 1970, California (San Francisco)

KRAFT, GEORGE H.,\* 1969 (1972), Associate Professor of Rehabilitation Medicine; M.D., 1963, Ohio State

KRAMAR, PIROSKA O., 1970, Instructor in Ophthalmology; B.S., 1959, Iowa State; M.S., 1963, M.D., 1964, Creighton

KRAMER, KARL D.,\* 1970 (1971), Associate Professor of Russian Language and Literature, Comparative Literature, and Russian and East European Studies; B.A., 1955, M.A., 1957, Ph.D., 1964, Washington

KRANING, KENNETH K., 1965 (1968), Research Assistant Professor of Medicine; M.S., 1962, Purdue; Sc.D., 1964, Pittsburgh

KRIEGER, ALEX D.,\* 1960 (1965), Professor of Anthropology and Latin American Studies; Adjunct Curator, Burke Memorial-Washington State Museum; B.A., 1936, California (Berkeley); M.A., 1939, Oregon; Sc.D., 1955, Universidad Nacional de México

KRISOLOGO, ROBERT B., 1972; Lecturer in Social Work; B.A., 1960, M.S.W., 1966, Wash-Ington

KROLL, MORTON,<sup>\*</sup> 1958 (1968), Professor of Public Affairs and Political Science; Associate Dean, College of Arts and Sciences; B.A., 1946, Ph.D., 1962, California (Los Angeles) KRONMAL, RICHARD A.,\* 1964 (1970), Associate Professor of Biostatistics; Chairman, Biomathematics Group; A.B., 1961, Ph.D., 1964, California (Los Angeles)

KRUCKEBERG, ARTHUR R.,\* 1950 (1964), Professor and Chairman of Botany; B.A., 1941, Occidental; Ph.D., 1950, California (Berkeley)

KRUMME, GUNTER,\* 1970, Associate Professor of Geography; M.A., 1962, f. Pol. Wissenschaften (Munich); Ph.D., 1966, Washington

KRUPSKI, EDWARD,\* 1944 (1962), Professor of Pharmaceutical Chemistry; B.S., 1939, M.S., 1941, Ph.D., 1949, Washington

KUCKHAHN, KARL O., 1973, Professor of Military Science; B.S., 1958, United States Military Academy; M.S., 1961, Hawaii

KUMMERT, RICHARD O.,\* 1964 (1967), Professor of Law; B.S., 1953, Illinois Institute of Technology; M.B.A., 1955, Northwestern; LL.B., 1961, Stanford

KUNDE, NORMAN PREDERICK, 1931 (1949), Associate Professor Emeritus of Physical Education; B.S., 1928, M.S., 1932, Washington; D.Ed., 1946, New York

KUNSTADTER, PETER,\* 1966 (1970), Associate Professor of Anthropology and Epidemiology and International Health; B.A., 1952, New Mexico; M.A., 1953, Cornell; Ph.D., 1961, Michigan

KUO, CHO-CHOU, 1971, Assistant Professor of Pathobiology; M.D., 1960, Taipei; Ph.D., 1970, Washington

KUSUMI, FUSAKO, 1961 (1970), Associate in Medicine; B.E., 1955, Toyama; M.S., 1960, Washington

KWIRAM, ALVIN L.,\* 1970, Associate Professor of Chemistry; B.S., B.A., 1958, Walla Walla; Ph.D., 1962, California Institute of Technology

KYDD, WILLIAM L., 1950 (1966), Research Associate in Oral Biology; B.S., 1944, D.M.D., 1946, Oregon

#### L

LABBE, ROBERT F., 1957 (1969), Professor of Pediatrics, Fircrest Research Laboratories; B.S., 1947, Portland; M.S., 1949, Ph.D., 1951, Oregon State

LACHAPELLE, EDWARD R.,\* 1956 (1973), Professor of Geophysics; Adjunct Professor of Atmospheric Sciences; B.S., 1949, D.Sc. (Hon.), 1967, Puget Sound

LAGACE, ARTHUR E., JR.,\* 1971 (1972), Assistant Professor of Health Services; B.A., 1963, Denver; M.H.A., 1965, Michigan; Ph.D., 1972, Colorado

LAGUARDIA, ERIC,\* 1961 (1966), Associate Professor of English; A.B., 1952, Hobart; A.M., 1955, Columbia; Ph.D., 1961, Iowa

LAGUNOFF, DAVID,\* 1960 (1969), Professor of Pathology; M.D., 1957, Chicago

LAINE, BETTY, 1970, Instructor in Dental Hygiene; B.S., 1968, Washington

LAIRD, CHARLES D.,\* 1971, Associate Professor of Zoology; Adjunct Associate Professor of Genetics; B.A., 1961, Oregon; Ph.D., 1966, Stanford

LAMSON, FRED W., 1966 (1972), Lecturer in Pediatrics; B.A., 1957, Omaha; M.S., 1965, D.Ed., 1966, Oregon LANDAU, BARBARA R., 1964 (1972), Associate Professor of Physiology and Biophysics and Biological Structure; B.S., 1945, M.S., 1949, Ph.D., 1956, Wisconsin

LANDERS, DANIEL MACARTHURE,\* 1972, Associate Professor of Physical Education; Adjunct Associate Professor of Psychology; B.A., 1963, San Jose State; M.S., 1965, Ph.D., 1968, Illinois (Champaign)

LANGER, ERNA E., 1969 (1973), Instructor and Senior Fellow in Medicine; M.D., 1963, Universitat, Frankfurt, Germany

LANGSLET, JANA, 1970, Instructor in Dental Hygiene; B.S., 1958, Washington

LARA, JIMMIE C., 1972, Assistant Professor of Microbiology; B.S., 1965, M.S., 1967, Los Angeles State; Ph.D., California (Riverside)

LARSEN, HOWARD B.,\* 1968 (1971), Associate Professor of Education; B.S., 1956, M.S., 1958, Brigham Young; Ed.D., 1964, Stanford

LARSEN, LAWRENCE H., 1967 (1971), Research Associate Professor of Oceanography; B.S., 1961, Stevens Institute of Technology; Ph.D., 1965, Johns Hopkins

LARSEN, LYNN A., 1968 (1971), Research Associate in Medicine; B.S., 1965, North Dakota; Ph.D., 1971, Washington

LARSEN, OTTO NYHOLM,\* 1949 (1962), Professor of Sociology; B.A., 1947, Ph.D., 1955, Washington

LARSON, CARL WILLIAM,\* 1969, Assistant Professor of Chemical Engineering; B.S., 1963, California (Los Angeles); M.S., 1965, San Diego State; Ph.D., 1969, Washington

LARSON, MARGARET L.,\* 1967 (1969) Assistant Professor of Psychosocial Nursing; Diploma, 1944, St. Luke's Hospital School of Nursing, Denver; B.S., 1949, Colorado; M.N., 1967, Washington

LASHER, EARL P., 1946 (1970), Associate Professor of Biological Structure; Clinical Associate Professor of Surgery; A.B., 1931, M.D., 1934, Cornell

LAURITZEN, PETER O.,\* 1965 (1973), Professor of Electrical Engineering; B.S., 1956, California Institute of Technology; M.S., 1958, Ph.D., 1961, Stanford

LAVIS, VICTOR R., 1967 (1971), Assistant Professor of Medicine; Assistant Director, Clinical Research Center, University Hospital; A.B., 1959, M.D., 1962, Stanford

LAW, DAVID B.,\* 1947 (1964), Professor of Pedodontics; B.S.D., D.D.S., 1938, M.S., 1941, Northwestern

LAWRENCE, DAVID M., 1972 (1973), Assistant Professor of Health Services; B.A., 1962, Amherst; M.D., 1966, Kentucky; M.P.H., 1973, Washington

LAWRENCE, GEORGE L.,\* 1968 (1973), Associate Professor of Education; B.S.Ed., 1960, M.Ed., 1961, Maine; Ed.D., 1968, George Peabody College for Teachers

LAWRENCE, JACOB,\* 1970 (1971), Professor of Art; Doctor of Fine Arts (Hon.), 1970, Denison

LAWSON, HAL A.,\* 1970, Assistant Professor of Physical Education; B.A., 1966, Oberlin; M.A.,-1967, Ph.D., 1969, Michigan

LAWSON, JANE SORRIE, 1922 (1952), Professor Emeritus of English; Consultant in Composition; M.A., 1907, St. Andrews (Scotland)

LAXSON, CAROL F., 1966, Lecturer in Microbiology; B.S., 1952, Iowa State; M.S., 1959, Wisconsin

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LEAHY, JACK THOMAS, 1957 (1968), Associate Professor of Humanistic-Social Studies; B.A., 1954, M.A., 1956, Washington

LEBERT, EDGAR A., 1967, Assistant Professor of Architecture; B.S. in C.E., 1965, Washington State; M.S. in S.E., 1967, Washington

LEBRETON, PRESTON P.,\* 1960, Professor of Business Policy and Comparative Administration; B.S., 1947, M.B.A., 1949, Louisiana State; Ph.D., 1953, Illinois

LECRONE, CAROL N., 1967 (1972), Assistant Professor of Laboratory Medicine; Director, Medical Technology; B.A., 1956, M.A., 1966, Colorado State

LEE, GERALD R., 1968, Assistant Professor of Education; B.A., 1960, Luther; Ph.D., 1968, Minnesota

LEE, JOHN A. H.,\* 1966, Professor of Epidemiology and International Health and Environmental Health; B.S.C., 1947, M.B., Ch.B., 1949, Edinburgh; D.P.H., 1952, London School of Hygiene and Tropical Medicine; M.D., 1955, Edinburgh

LEE, KAI NIEN, 1973, Research Assistant Professor of Political Science and Social Management of Technology; A.B., 1966, Columbia; Ph.D., 1971, Princeton

LEE, MING JONG, 1972, Instructor in Pathology; B.S., 1956, National Taiwan University; M.D., 1963, Gunma

LEECH, RICHARD W., 1971 (1973), Assistant Professor of Pathology; B.A., 1957, M.D., 1961, Washington

LEGTERS, LYMAN H.,\* 1966 (1968), Professor of Russian and East European Studies; A.B., 1949, Michigan; M.A., 1956, Boston; Ph.D., 1958, Free University (Berlin)

LEIGH, JAMES W.,\* 1967, Associate Professor of Social Work; B.A., 1952, M.S.W., 1954, Wayne State; Third-Year Diploma, 1961, Smith

LEIK, JEAN, 1964, Research Associate in Biological Structure; B.S., 1948, Rhode Island; M.A., 1952, Oregon; Ph.D., 1965, Wisconsin

LEIN, JOHN N., 1964 (1969), Associate Professor of Obstetrics and Gynecology; Director, Continuing Medical Education; Associate Dean, School of Medicine; B.S., 1951, Idaho; M.D., 1955, Washington

LEINER, JACQUELINE,<sup>\*</sup> 1963 (1973), Associate Professor of French, Comparative Literature, and African Studies; Diplome d'Etudes Superieures, 1948, Universite de Paris Institut d'Histoire (France)

LEINER, WOLFGANG,\* 1965 (1967), Professor of French Language and Literature and Comparative Literature; B.A., 1949, Universite de Toulouse; Dr. Phil., 1955, Universite de la Sarre; Habilitation, 1963, Universitat des Saarlandes

LEITCH, CYNTHIA J., 1973, Assistant Professor of Family and Community Nursing; B.S., 1954, Iowa; M.S., 1971, Ph.D., 1973, Utah

LEMIRE, RONALD J., 1967 (1972), Associate Professor of Pediatrics; Coordinator, WAMI Pediatric Program; M.D., 1962, Washington

LENDZION, ANITA L., 1971, Research Instructor in Maternal and Child Nursing; B.S.N., 1970, Nazareth; M.N., 1971, Washington

LENEY, LAWRENCE,\* 1960 (1962), Associate Professor of Wood Science and Technology; B.S., 1942, M.S., 1948, Ph.D., 1960, New York State

LEONARD, PHYLLIS L., 1972, Assistant Professor of Maternal and Child Nursing; B.S.N., 1953, M.N., 1960, Washington LEOVY, CONWAY B.,\* 1968 (1973), Professor of Atmospheric Sciences and Geophysics; Adjunct Professor of Astronomy; A.B., 1954, Southern California; Ph.D., 1963, Massachusetts Institute of Technology

LERNER, KENNETH G., 1970 (1973), Instructor in Pathology; B.A., 1962, M.D., 1965, Wayne State (Michigan)

LESSINGER, JACK,\* 1964 (1968), Professor of Urban Development; B.S., 1943, Ph.D., 1956, California

LETTICH, ETTORE, 1966, Research Associate in Neurological Surgery and Laboratory Medicine; Fr. B.A., 1947, St. Mary's (Egypt)

LEUBA, CHRISTOPHER,\* 1968 (1971), Associate Professor of Music; B.Mus., 1951, Roosevelt

LEV, DANIEL S.,\* 1970, Associate Professor of Political Science; B.A., 1955, Miami (Ohio); Ph.D., 1964, Cornell

LEVINE, SHEPPARD M., 1969, Assistant Professor of Periodontics; B.A., 1958, Yeshiva; D.D.S., 1962, Columbia

LEVY, FRED JACOB,\* 1960 (1967), Associate Professor of History; A.B., 1954, A.M., 1956, Ph.D., 1960, Harvard

LEVY, RENE H.,\* 1970, Assistant Professor of Biopharmaceutics; B.S., 1965, Paris; Ph.D., 1970, California

LEW, JENNIFER,\* 1970, Assistant Professor of Art; B.A., B.F.A., 1968, Washington; M.A., 1970, Pratt Institute

LEWIN, JOYCE C.,\* 1965 (1969), Professor of Oceanography; B.S., 1948, Cornell; M.S., 1950, Ph.D., 1953, Yale

LEWIN, THOMAS F., 1966, Professor of Social Work; B.A., 1937, West Virginia; M.A., 1942, Ph.D., 1962, Chicago

LEWIS, BRIAN T. R.,\* 1970 (1973), Assistant Professor of Oceanography and Geophysics; B.S., 1963, Cape Town; B.S., 1963, Witwaterstrand; Ph.D., 1970, Wisconsin

LEWIS, CHARLES H., 1971, Instructor in Otolaryngology; B.A., 1965, M.A., 1966, Montana

LEWIS, JOE L., 1972, Research Assistant Professor of Psychology; B.A., 1966, California State (Fullerton); Ph.D., 1970, Oregon

LEWIS, LAUREL J.,\* 1946 (1954), Professor of Electrical Engineering; A.B., 1933, E.E., 1935, Ph.D., 1947, Stanford

LEWIS, PAUL, 1971, Lecturer in Architecture; B.A.Ed., 1969, M.Arch., 1971, Washington

LEWIS, THOMPSON M.,\* 1955 (1963), Professor of Pedodontics; Assistant Dean, School of Dentistry; Chairman, Continuing Dental Education; D.D.S., 1950, Northwestern; M.S.D., 1955, Washington

LI, DAVID H.,\* 1965, Professor of Accounting; A.B., 1949, St. John's (Shanghai); M.B.A., 1950, Pennsylvania; Ph.D., 1953, Illinois

LIEBER, MICHAEL D.,\* 1968, Assistant Professor of Anthropology; A.B., 1960, Trinity; Ph.D., 1968, Pittsburgh

LIEBERMAN, IRVING,\* 1956, Professor of Librarianship; B.S., 1935, New York; B.S. (L.S.), 1939, M.A., 1950, Ed.D., 1955, Columbia

LILLYWHITE, JACK. W., 1971 (1973), Instructor in Restorative Dentistry; B.S., 1961, Washington State; D.D.S., 1965, Washington

LIN, JAMES C., 1971, Instructor in Rehabilitation Medicine; B.S., 1966, M.S., 1968, Ph.D., 1971, Washington LINCOLN, JOHN A., 1972, Assistant Professor of Family Medicine; Coordinator, Family Practice Residency Program; Director, Family Medical Center; A.B., 1948, Syracuse; M.D., 1952, New York

LINDNER, ARMANDO, 1968 (1971), Instructor in Medicine; B.D., 1957, First National; M.D., 1964, Buenos Aires

LINDOP, MICHAEL J., 1973, Instructor in Anesthesiology; M.A., M.B., B.Ch., 1963, Gonville and Caius College (England); M.R.C.S., L.R.C.P., 1966, Guy's Hospital Medical School (England)

LING, HSIN-YI, 1963 (1969), Research Associate Professor of Oceanography; B.S., 1953, National Taiwan University; M.S., 1958, Tohoku University; Ph.D., 1963, Washington (St. Louis)

LINGAFELTER, EDWARD CLAY, JR.,\* 1939 (1952), Professor of Chemistry; B.S., 1935, Ph.D., 1939, California (Berkeley)

LINSCOTT, MELVILLE S., 1970 (1972), Instructor and Assistant in Medicine; A.B., 1965, M.D., 1969, Kansas

LIOU, KUO-NAN, 1972, Research Assistant Professor of Atmospheric Sciences; B.S., 1965, National Taiwan University; M.S., 1968, Ph.D., 1970, New York University

LIPPERT, FREDERICK G. III, 1972, Assistant Professor of Orthopaedics; B.S., 1956, Annapolis; M.D., 1965, Vermont; Ph.D., 1971, Karolinska Institute (Stockholm)

LIPSCOMB, KIRK M., 1971 (1973), Instructor in Medicine; B.S., 1962, M.D., 1966, Louisiana State

LISHNER, LEON,\* 1964, Professor of Music; B.S.S., 1937, New York City College

LISTER, CLIVE R. B.,\* 1965 (1972), Associate Professor of Geophysics and Oceanography; B.A., 1959, Trinity College (Cambridge); Ph.D., 1962, Cambridge

LISTON, JOHN,\* 1957 (1969), Professor of Fisheries; Director, Institute for Food Science and Technology; B.S., 1952, Edinburgh; Ph.D., 1955, Aberdeen

LITTLE, DOLORES E.,\* 1951 (1968), Professor of Comparative Nursing Care Systems; B.S., 1946, M.N., 1957, Washington

LITTLE, ROBERT W.,\* 1961 (1964), Associate Professor of Marketing; B.S., 1953, M.B.A., 1956, D.B.A., 1961, Indiana

LITTLE, WALLACE I.,\* 1954 (1962), Professor of Transportation; B.S., 1943, M.S., 1947, Illinois; Ph.D., 1952, Wisconsin

LIVINGSTON, CAROLYN A., 1973, Instructor in Comparative Nursing Care Systems; B.S.N., 1970, Wayne State; M.S., 1972, Washington

LOBENSTEIN, ALICE L., 1971, Instructor in Maternal and Child Nursing; B.A., 1961, Kansas State; B.S., 1964, Colorado; M.N., 1970, Washington

LOCKARD, JOAN S.,\* 1964 (1969), Assistant Professor of Neurological Surgery; Adjunct Assistant Professor of Psychology; A.B., 1958, M.S., 1961, San Diego State; Ph.D., 1963, Wisconsin

LOCKARD, ROBERT B.,\* 1962 (1970), Professor of Psychology; B.A., 1955, California (Santa Barbard); M.S., 1961, Ph.D., 1962, Wisconsin

LOCKWOOD, THOMAS FRANK,\* 1967 (1973), Associate Professor of English; B.A., 1964, Ph.D., 1967, Rice

LOESER, JOHN D., 1969, Assistant Professor of Neurological Surgery; B.A., 1957, Harvard; M.D., 1961, New York University LOFTUS, ELIZABETH F.,\* 1973, Assistant Professor of Psychology; B.A., 1966, California (Los Angeles); M.A., 1967, Ph.D., 1970, Stanford

LOFTUS, GEOFFREY R.,\* 1972, Assistant Professor of Psychology; B.A., 1967, Brown; Ph.D., 1971, Stanford

LONGYEAR, CHRISTOPHER RUDSTON, 1972, Associate Professor of English; B.S., 1952, Lehigh; M.A., 1955, Ph.D., 1961, Michigan

LOOMIS, TED A.,\* 1947 (1957), Professor of Pharmacology; State Toxicologist; B.S., 1939, Washington; M.S., 1941, Ph.D., 1943, Buffalo; M.D., 1946, Yale

LOOP, JOHN W., 1959 (1965), Associate Professor of Radiology; M.D., 1952, Harvard; B.S., 1948, Wyoming

LOPER, ROBERT B.,\* 1967 (1968), Professor of Drama; B.A., 1948, M.A., 1950, Colorado; Ph.D., 1957, Birmingham

LOPEZ, VICENTE, 1972, Research Assistant Professor of Pediatrics; B.S., 1953, Instituto de San Isidro de Madrid; M.D., 1961, Barcelona (Spain)

LORAINE, MICHAEL B.,\* 1967 (1968), Assistant Professor of Near Eastern Languages and Literature (Persian), Comparative Literature, and Near Eastern Studies; B.A., 1958, M.A., 1962, Ph.D., 1968, Cambridge

LORD, GARY EVANS, 1970, Senior Research Associate in Fisheries; B.S., 1958, Ph.D., 1963, Washington

LORD, JAMES L.,\* 1965 (1971), Assistant Professor of Prosthodontics; B.S., 1960, Washington State; D.D.S., 1964, Washington

LORD, JERE JOHNS,\* 1952 (1962), Professor of Physics; A.B., 1943, Reed; M.A., 1948, Ph.D., 1950, Chicago

LORENZEN, CARL, 1973, Research Associate Professor of Oceanography; B.S., 1959, M.S., 1962, Ph.D., 1964, Cornell

LORENZEN, RICHARD L.,\* 1970, Assistant Professor of Drama; B.A., 1964, California State (Long Beach); M.A., 1966, Ph.D., 1968, Ohio State

LORIG, ARTHUR N., 1934 (1949), Professor Emeritus of Accounting; B.A., 1922, Wisconsin; M.A., 1932, Stanford; Ph.D., 1936, Chicago; C.P.A., 1927, State of California (Washington)

LOUCKS, ROGER B., 1936 (1948), Professor Emeritus of Psychology; B.S., 1927, Ph.D., 1930, Minnesota

LOUNSBURY, WARREN C.,\* 1948 (1964), Associate Professor of Drama; B.A., 1946, Western Reserve; M.A., 1953, Washington

LOVE, WILLIAM J.,\* 1970, Professor of Mechanical Engineering; B.S., 1944, M.S., 1948, Colorado; Ph.D., 1952, Illinois

LOVETT, WENDELL,\* 1948 (1969), Professor of Architecture; B.Arch., 1947, Washington; M.Arch., 1948, Massachusetts Institute of Technology

LOVITT, THOMAS C.,\* 1967 (1972), Professor of Education; B.A., 1952, M.A., 1959, Ed.D., 1966, Kansas

LOWE, MICHAEL CRAIG, 1973, Assistant Professor of Pathology; B.S., 1964, Washington State; M.S., 1968, Ph.D., 1970, Washington

LOWE, RICHARD D.,\* 1972, Assistant Professor of Prosthodontics; B.S., 1951, Ashland; D.D.S., 1959, Western Reserve; M.S.D., 1966, Washington

LOWENBRAUN, SHEILA,\* 1968 (1972), Associate Professor of Education; B.A., 1961, Barnard; M.A., 1962, Ph.D., 1969, Columbia

LUBATTI, HENRY J.,\* 1969, Associate Professor of Physics; A.B., 1960, California (Berkeley); M.S., 1963, Illinois; Ph.D., 1966, California (Berkeley)

LUCCI, JENNIE ANNE,\* 1963 (1970), Assistant Professor of Rehabilitation Medicine; Head, Occupational Therapy, Department of Rehabilitation Medicine; B.S., 1953, Western Michigan; M.A., 1957, Southern California

LUCHTEL, DANIEL L., 1971 (1973), Research Associate in Environmental Health; B.S., 1963, St. Benedict's; Ph.D., 1969, Washington

LUCIAN, MIRIAM,\* 1972 (1973), Assistant Professor of Philosophy; B.S., 1968, Massachusetts Institute of Technology; M.S., 1970, Ph.D., 1972, Harvard

LUDWIG, RICHARD L.,\* 1971, Associate Professor of Urban Planning; B.S., 1963, Indiana; M.U.P., 1965, Washington; Diploma, 1968, Centre de Recherche d'Urbanisme, Paris; Ph.D., 1971, Pittsburgh

LUFT, JOHN H.,\* 1956 (1967), Professor of Biological Structure; B.S., 1949, M.D., 1953, Washington

LUKENS, EUGENE M., 1963 (1972), Assistant Professor of Prosthodontics; D.D.S., 1954, Washington

LUKOFF, FRED,\* 1964 (1967), Associate Professor of Korean and East Asian Studies; Adjunct Associate Professor of Linguistics; B.A., 1947, M.A., 1948, Ph.D., 1954, Pennsylvania

LUMER, GUNTER,\* 1961 (1967), Professor of Mathematics; B.S., 1948, State College of Montevideo; E.E., 1951, Montevideo; Ph.D., 1959, Chicago

LUMER, LINDA, 1966 (1973), Lecturer in Mathematics; Agregation of Math., 1952, Grenoble; Doctorat es sciences, 1957, Paris

LUMSDAINE, ARTHUR A.,\* 1965, Professor of Psychology and Education; B.S., 1937, Washington; Ph.D., 1949, Stanford

LUND, JENNIFER S., 1968 (1971), Assistant Professor of Ophthalmology; B.S., 1962, Ph.D., 1966, University College (London)

LUND, RAYMOND D.,\* 1968 (1973), Associate Professor of Neurological Surgery and Biological Structure; B.Sc., 1961, Ph.D., 1963, University College (London)

LUNDIN, NORMAN K.,\* 1964 (1969), Associate Professor of Art; B.A., 1961, School of the Art Institute, Chicago; M.F.A., 1963, Cincinnati

LUNDQUIST, BARBARA R., 1973, Associate Professor of Music; M.A., 1958, Montana State; B.Mus., 1953, Wisconsin; D.M.A., 1973, Washington

LUNNEBORG, CLIFFORD E.,\* 1962 (1967), Associate Professor of Psychology; Director, Educational Assessment Center; B.S., 1954, M.S., 1957, Ph.D., 1959, Washington

LUNNEBORG, PATRICIA W.,\* 1967 (1971), Associate Professor of Psychology; B.S., 1955 Cornell; M.S., 1959, Washington; Ph.D., 1962, Texas

LUSCHEI, ERICH S.,\* 1968 (1973), Associate Professor of Physiology and Biophysics; Assistant Director, Regional Primate Research Center; B.S., 1964, Ph.D., M.S., 1957, Ph.D., 1959, Washington

LYDEN, FREMONT JAMES,\* 1962 (1966), Associate Professor of Public Affairs; B.A., 1950, M.P.A., 1952; Ph.D., 1960, Washington

LYNCH, JAMES ERIC, 1931, Professor Emeritus of Fisheries; B.A., 1917, M.A., 1921, Nebraska; Ph.D., 1929, California (Berkeley) LYNESS, VIRGINIA BERGMAN,\* 1963 (1967), Assistant Professor of Law; B.A., 1950, J.D., 1962, Washington

LYTLE, DEAN W.,\* 1958 (1969), Professor of Electrical Engineering; B.S. in E.E., 1950, California; M.S. in E.E., 1954, Ph.D., 1957, Stanford

LYTLE, SCOTT HARRISON,\* 1949 (1957), Associate Professor of History; A.B., 1940, Princeton; Ph.D., 1948, Cornell

#### M

MACARTNEY, THOMAS W., 1946 (1957), Associate Professor of Civil Engineering; B.S. in C.E., 1939, B.S. in Com.E., 1946, M.S. in C.E., 1956, Washington

MACDONALD, CATHERINE J.,\* 1945 (1966), Associate Professor of Social Work; B.A., 1936, Washington

MACDONALD, CECILIA,\* 1949 (1972), Associate Professor Emeritus of Elementary Education; B.A., 1946, Central Washington College of Education; M.Ed., 1952, Washington

MACDONALD, ROBERT WESLEY,\* 1960 (1964), Associate Professor of Social Work; B.A., 1948, United (Winnipeg); B.S.W., 1949, M.S.W., 1956, British Columbia; Ph.D., 1964, Minnesota

MACELVEEN, PATRICIA M.,\* 1971, Assistant Professor of Psychosocial Nursing; Diploma, 1952, Vassar Brothers Hospital; B.S., 1967, Ph.D., 1971, Colorado

MACISAAC, LINDA D., 1973, Health Services Research Associate; B.A., 1966, Oregon

MACKAY, PIERRE A.,\* 1970, Associate Professor of Classics, Near Eastern Languages and Literature, Comparative Literature, and Near Eastern Studies; B.A., 1954, Yale; M.A., 1959, Ph.D., 1964, California (Berkeley)

MACKLER, BRUCE, 1957 (1961), Professor of Pediatrics; Head, Division of Developmental Biology; M.D., 1943, Temple

MACKLIN, JOHN W.,\* 1968, Assistant Professor of Chemistry; B.S., 1962, Linfield; Ph.D., 1968, Cornell

MACLACHLAN, DOUGLAS L.,\* 1970, Assistant Professor of Marketing; A.B., 1963, M.B.A., 1965, M.A., 1970, Ph.D., 1971, California (Berkeley)

MACLEAN, DOROTHY G., 1936 (1965), Associate Professor Emeritus of Physical Education; B.S., 1933, Oregon; M.S., 1938, Washington

MADSEN, DAVID L.,\* 1971, Professor of Education; Ph.B., North Dakota; A.M., 1954, Ph.D., 1961, Chicago

MAGIE, MICHAEL LAWTON, 1968 (1971), Assistant Professor of English; A.B., 1962, M.A., 1966, Ph.D., 1971, California (Los Angeles)

MAH, FENG-HWA,\* 1961 (1964), Associate Professor of Economics and East Asian Studies; B.L., 1947, Peking; M.A., 1956, Ph.D., 1959, Michigan

MAIER, HENRY W.,\* 1959, Professor of Social Work; B.A., 1947, Oberlin; M.S.S.C., 1949, Western Reserve; Ph.D., 1959, Minnesota

MAKOUS, WALTER L.,\* 1966 (1969), Associate Professor of Psychology; B.S., 1958, Wisconsin; M.S., 1961, Ph.D., 1964, Brown

MALLORY, V. STANDISH,\* 1952 (1962), Professor of Geological Sciences; Curator, Washington State Museum; A.B., 1943, Oberlin; M.A., 1948; Ph.D., 1952, California (Berkeley)



MALONEY, NORMA A., 1960 (1970), Research Associate in Medicine; B.S., 1948, University of the Philippines; M.S., 1952, Emory; Ph.D., 1961, Minnesota

MANDELBAUM, LEONARD B., 1971, Associate Professor of Urban Planning; J.D., 1957, Yale; M.A., 1966, Ph.D., 1973, American

MANHAS, DEV R., 1970 (1973), Assistant Professor of Surgery; M.B.B.S., 1959, Amritsar Medical College; M.S., 1963, Punjab University

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MANNIK, MART,\* 1966, Associate Professor of Medicine; Adjunct Professor of Microbiology; B.A., 1956, Ohio Northern; M.D., 1959, Western Reserve

MANSFIELD, LOUISE W.,\* 1951 (1969), Professor of Physiological Nursing; Diploma, Samaritan Hospital, Idaho; B.S., 1947, Ohio State; M.A., 1951, Columbia

MANUWAL, DAVID A., 1972 (1973), Assistant Professor of Forest Zoology; B.S., 1966, Purdue; M.S., 1968, Montana; Ph.D., 1972, California (Los Angeles)

MAR, BRIAN W.,\* 1967 (1973), Professor of Civil Engineering and Environmental Studies; Adjunct Professor of Fisheries and Forest Resources; B.S., 1955, M.S. in Ch.E., 1957, Ph.D., 1958, M.S.E. (Civil), 1967, Washington

MARCHIORO, THOMAS L.,\* 1967 (1969), Professor of Surgery; B.S., 1951, Gonzaga; M.D., 1955, St. Louis

MARCKWORTH, GORDON DOTTER, 1939 (1965), Dean and Professor Emeritus of Forest Resources; B.S.F., 1916, Ohio State; M.F., 1917, Yale

MARCUS, SUMNER,\* 1955 (1961), Professor of Law and Business-Government Relations; A.B., 1931, M.B.A., 1933, LL.B., 1936, Harvard; D.B.A., 1958, Washington; admitted to practice in Massachusetts and Washington

MARGOLIS, M. THEODORE, 1972, Associate Professor of Radiology; M.D., 1960, Tufts

MARKS, CHARLES E.,\* 1966 (1972), Assistant Professor of Philosophy; B.A., 1962, Reed; Ph.D., 1972, Cornell

MARLATT, G. ALLEN,\* 1972, Associate Professor of Psychology; B.A., 1964, British Columbia; Ph.D., 1968, Indiana

MARSHALL, FRANK R., 1968 (1970), Associate Professor of Mechanical Engineering; B.A., 1951, Carroll; M.S., 1953, Montana

MARSHALL, JOHN,\* 1970, Associate Professor of Art; B.F.A., 1965, Cleveland Institute of Art; M.F.A., 1967, Syracuse

MARTIN, ARTHUR W., JR.,\* 1937 (1950), Professor of Physiology; B.S., 1931, Puget Sound; Ph.D., 1936, Stanford

MARTIN, CHARLES E., 1924 (1962), Professor Emeritus of Political Science; B. of Lit., 1914, M.A., 1915, California (Berkeley); Ph.D., 1918, Columbia; LL.D., 1942, Southern California

MARTIN, DONALD C.,\* 1972, Associate Professor of Biostatistics; Adjunct Associate Professor of Psychiatry and Behavioral Sciences; B.S., 1960, M.S., 1961, Ph.D., 1968, Florida State

MARTIN, GEORGE M.,\* 1957 (1968), Professor of Pathology; B.S., 1949, M.D., 1953, Washington

MARTIN, JOAN C., 1972, Associate Professor of Psychiatry and Behavioral Sciences; B.A., 1959, Florida; M.S., 1962, Ph.D., 1965, Florida State

MARTIN, RICHARD D.,\* 1969, Assistant Professor of Electrical Engineering; B.S.E., 1959, Princeton; M.S.E., 1965, Washington; Ph.D., 1969, Princeton

MARTIN, ROBERT E.,\* 1971, Professor of Forest Resources; B.S., 1953, Marquette; B.S., 1958, M.F., 1959, Ph.D., 1963, Michigan

MARTIN, SEELYE, 1968, Research Assistant Professor of Oceanography; B.A., 1962, Harvard; Ph.D., 1967, Johns Hopkins

MARTIN, WAYNE E., 1966 (1971), Associate Professor of Anesthesiology; B.A., 1954, Texas; M.D., 1958, Southwestern

MARTINSEN, CHARLENE SWARTZ, 1969, Lecturer in Home Economics; B.S., 1964, M.S., 1966, Iowa State

MARTS, MARION E.,\* 1946 (1961), Professor of Geography and Urban Planning; Adjunct Professor of Environmental Studies; Dean, Summer Quarter; B.A., 1937, M.A., 1944, Washington; Ph.D., 1950, Northwestern

MASON, ALDEN C.,\* 1946 (1965), Professor of Art; B.A., 1942, M.F.A., 1947, Washington

MASUDA, MINORU, 1956 (1972), Professor of Psychiatry and Behavioral Sciences; B.S., 1936, M.S., 1938, Ph.D., 1956, Washington

MATCHES, JACK RONALD,\* 1965 (1972), Associate Professor of Fisherles; B.S., 1957; M.S., 1958, Oregon State; Ph.D., 1963, Iowa State

MATCHETT, WILLIAM H.,\* 1954 (1966), Professor of English; B.A., 1949, Swarthmore; M.A., 1950, Ph.D., 1957, Harvard

MATHER, LAWRENCE L., 1972, Research Instructor in Anesthesiology; B.Sc., 1965, New South Wales (Australia); M.Sc., 1968, Ph.D., 1972, Sydney (Australia)

MATHEWS, BETTY PHELPS,\* 1972, Professor of Health Education; B.S., 1952, M.P.H., 1953, D.P.H., 1960, California (Berkeley)

MATHEWS, STEPHEN BARSTOW,\* 1969' (1973), Assistant Professor of Fisheries; B.A., 1959, Washington; M.A., 1962, California (Berkeley); Ph.D., 1967, Washington

MATHISEN, OLE ALFRED,\* 1956 (1968), Professor of Fisheries; B.S., 1945, M.S., 1945, Oslo; Ph.D., 1955, Washington

MATTOCK, ALAN H.,\* 1964, Professor of Civil Engineering; B.Sc., (Eng.), 1945, M.Sc., 1949, Ph.D., 1955, London

MAUCH, JARRELL F., 1973, Lecturer in Landscape Architecture; B.S., 1967, San Jose State

MAXIM, PETER, 1973, Assistant Professor of Psychiatry and Behavioral Sciences; B.A., 1962, M.D., 1966, Yale; Ph.D., 1971, Stanford

MAY, ROBERT G.,\* 1970 (1973), Associate Professor of Accounting; Director, Doctoral Programs, School of Business Administration; B.A., 1965, Ph.D., 1969, Michigan State

MC ARTHUR, JAMES R., 1973, Associate Professor of Medicine; Assistant Director, Health Science Center Office of Learning Resources; B.A., 1952, Reed; M.D., 1956, Harvard

MC CAFFREE, KENNETH M.,\* 1949 (1967), Professor of Economics and Health Services; B.A., 1940, Southwestern; M.A., 1942, Denver; Ph.D., 1950, Chicago

MC CALLUM, I. STEWART,\* 1970, Assistant Professor of Geological Sciences; B.Sc., 1960, St. Andrews (Scotland); Ph.D., 1968, Chicago

MC CANN, BARBARA W., 1973, Research Associate in Health Services (MEDEX); B.A., 1968, Brown

MC CANN, JAMES C.,\* 1969 (1971), Assistant Professor of Sociology; A.B., 1963, Boston; M.A., 1966, Connecticut; Ph.D., 1972, Brown MC CARTER, DONNA C., 1972, Research Associate in Health Services (MEDEX); B.S.N., 1969, M.S.N., 1972, Washington

MC CARTHY, WALTER C.,\* 1949 (1965), Professor of Pharmaceutical Chemistry; B.S., 1943, Massachusetts Institute of Technology; Ph.D., 1949, Indiana

MC CARTIN, ROSEMARIE E.,\* 1969, Associate Professor of Education; B.A., 1955, Great Falls; M.A., 1960, Immaculate Heart (Los Angeles); Ph.D., 1964, Southern California

MC CAUGHRAN, DONALD A.,\* 1969 (1972), Assistant Professor of Fisheries and Forest Resources; B.S., 1959, M.S., 1962, British Columbia; Ph.D., 1969, Cornell

MC COLL, WILLIAM, 1968 (1971), Associate Professor of Music; Graduate, 1955, State Academy of Music, Vienna

MC CORMICK, NORMAN J.,\* 1966 (1970), Associate Professor of Nuclear Engineering; B.S., 1960, M.S., 1961, Illinois; Ph.D., 1965, Michigan

MC CRACKEN, JAMES DAVID,\* 1966 (1971), Associate Professor of English; B.A., 1961, Oberlin; M.A., 1962, Ph.D., 1966, Chicago

MC DERMOTT, LILLIAN CHRISTIE,\* 1967 (1973), Assistant Professor of Physics; B.A., 1952, Vassar; M.A., 1956, Ph.D., 1959, Columbia

MC DERMOTT, MARK N.,\* 1962 (1967), Associate Professor of Physics; B.A., 1952, Whitman; M.A., 1956, Ph.D., 1959, Columbia

MC DIARMID, JOHN BRODIE,\* 1949 (1956), Professor of Classics and Comparative Literature; B.A., 1936, Toronto; Ph.D., 1940, Johns Hopkins

MC DONOUGH, JOHN R., 1968 (1970); Assistant Professor of Medicine; B.S., 1952, Seattle University; M.S., M.D., 1954, Creighton; M.P.H., 1959, California

MC ELROY, COLLEEN W., 1972 (1973), Assistant Professor of English; B.S., 1958, M.A., 1963, Kansas State; Ph.D., 1973, Washington

MC FARLAN, LEE HORACE, 1927 (1946), Professor Emeritus of Mathematics; B.S., 1917, Kansas State Teachers; A.M., 1921, Ph.D., 1924, Missouri

MC FERON, DEAN EARL,\* 1958, Professor of Mechanical Engineering; B.S. in M.E., 1945, M.S. in M.E., 1948, Colorado; Ph.D., 1956, Illinois

MC GEE, JOHN S.,\* 1966 (1968), Professor of Economics; A.B., 1947, Texas; Ph.D., 1952, Vanderbilt

MC GONAGLE, LEE ANNE, 1970, Instructor in Laboratory Medicine, Division of Medical Technology; B.S., 1961, Washington; M.P.H., 1969, Michigan

MC GUIRE, RICHARD L., 1968, Assistant Professor of English; A.B., 1961, M.A., 1963, Kansas State; Ph.D., 1968, Rice

MC INNES, DONALD MC LEOD, 1966 (1970), Associate Professor of Music; A.B., 1963, California (Santa Barbara); M.M., 1966, Southern California

MC INTYRE, CATHERINE E., 1973, Research Associate in Comparative Nursing Care Systems; B.A., 1970, M.S.W., 1972, Washington

MC INTYRE, HARRY JOHN, 1919 (1958), Professor Emeritus of Mechanical Engineering; B.S. in M.E., 1915, M.B.A., 1923, Washington

MC JILTON, CHARLES E., 1971, Instructor in Environmental Health; A. B., 1958, Carroll; B.S., 1962, M.S., 1965, Ph.D., Minnesota; Ph.D., 1973, Washington MC KEEVER, BENJAMIN B.,\* 1949, Associate Professor of Psychology; A.B., 1930, M.A., 1931, Harvard; Ph.D., 1940, Iowa

MC KINNON, RICHARD N.,\* 1951 (1969), Professor of Japanese, Comparative Literature, and East Asian Studies; Associate Director, Center for Asian Arts; A.B., 1947, A.M., 1949, Ph.D., 1951, Harvard

MC LEAN, EDWARD B., 1972, Instructor in Ophthalmology; B.A., 1957, Brown; M.D., 1966, Utah

MC LEAN, SAMMY K.,\* 1967 (1973), Associate Professor of Germanic Languages and Literature and Comparative Literature; B.A., 1952, Oklahoma; M.A., 1957, Ph.D., 1963, Michigan

MC MANUS, DEAN A.,\* 1959 (1971), Professor of Oceanography; Adjunct Professor of Marine Studies; B.S., 1954, Southern Methodist; M.S., 1956, Ph.D., 1959, Kansas

MC MILLAN, JO ANN,\* 1963, Assistant Professor of Rehabilitation Medicine; Head, Physical Therapy, Department of Rehabilitation Medicine; B.S., 1953, North Texas State; Certificate in Physical Therapy, 1955, Mayo Clinic; M.S., 1968, Southern California

MC MINN, BRYAN TOWNE, 1920 (1964), Professor Emeritus of Mechanical Engineering; B.S. in M.E., 1918, Oregon State; M.S. in M.E., 1926, M.E., 1931, Washington

MC NEESE, DONALD C., 1946 (1956), Assoclate Professor of Civil Engineering; B.S. in C.E., 1940, C.E., 1951, Wyoming

MC NEILL, R. WILLIAM, 1964 (1972), Associate Professor of Orthodontics; D.D.S., 1960, M.S., 1962, Pennsylvania

MC PHERSON, DAVID L., 1973, Assistant Professor of Otolatyngology; B.S., 1967, Brigham Young; M.A., 1969, George Washington; Ph.D., 1972, Washington

MEACHAM, MERLE L.,\* 1966 (1973), Professor of Education; B.A., 1948, Reed; M.S., 1956, Washington; Ed.D., 1965, Washington State

MEADOR, HENRY THOMAS, 1956 (1969), Lecturer in Mechanical Engineering; B.A., 1943, B.S., 1954, Washington; M.S., 1956, Oregon State

MEADOR, PRENTICE A., JR.,\* 1971, Associate Professor of Speech; B.A., 1960, David Lipscomb; M.A., 1961, Ph.D., 1964, Illinois

MEDFORD, WILLIAM R., Assistant Professor of Naval Science; B.S., 1969, United States Naval Academy

MEESE, RICHARD H.,\* 1946 (1955), Associate Professor of Civil Engineering; B.S. in C.E., 1939, Washington; S.M., 1941, Harvard

MEEUSE, BASTIAAN J. D.,\* 1952 (1960), Professor of Botany; B.S., 1936, Doctoraal, 1939, Leiden; Ph.D., 1943, Delft

MEIER, ROBERT C.,\* 1957 (1968), Professor of Operations Systems; Adjunct Professor of Environmental Studies; B.S., 1952, Indiana; M.A., 1955, Ph.D., 1961, Minnesota

MEISENHOLDER, ROBERT,\* 1954, Professor of Law; A.B., 1936, South Dakota; J.D., 1939, S.J.D., 1942, Michigan

MELD, MURRAY B., 1970, Associate Professor of Community and Organizational Development; B.S.S., 1941, College of the City of New York; M.S.W., 1949, Columbia

MEMMER, RAMONA J., 1960, Lecturer in Microbiology; B.A., 1955, South Dakota; M.S., 1957, Washington

MERANTO, PHILIP J.,\* 1971, Associate Professor of Political Science; B.S., 1960, State University of New York; Ph.D., 1966, Syracuse MERCHANT, FREDERICK W., 1973, Instructor in Biological Structure; B.S., 1969, Gustavus Adolphus; M.S., 1972, Ph.D., 1973, Michigan

MERCHANT, HOWARD CARL,\* 1961 (1967), Associate Professor of Mechanical Engineering; B.S., 1956, Washington; S.M., 1957, Massachusetts Institute of Technology; Ph.D., 1961, California Institute of Technology

MERENDINO, K. ALVIN,\* 1948 (1955), Professor of Surgery; B.A., 1936, Ohio; M.D., 1940, Yale; Ph.D., 1946, Minnesota

MERRILL, O. MONTE, 1962 (1969), Research Associate in Orthodontics; B.S., 1953, Utah State; D.D.S., 1961, M.S., 1968, Washington

MERRILL, RONALD T.,\* 1967 (1972), Associate Professor of Geophysics and Oceanography; B.S., 1959, M.S., 1961, Michigan; Ph.D., 1967, California (Berkeley)

MESLER, FLORENCE, 1968, Assistant Professor of Music; B.Mus., 1959, M.Mus., 1961, Puget Sound

MESSER, ROWLAND E., 1946 (1957), Associate Professor of Mechanical Engineering; B.S. in M.E., 1935, Washington

MEYER, C. BEAT, \* 1964 (1967), Associate Professor of Chemistry; B.A., 1954, Kant. Gym. (Zurich); Ph.D., 1960, Zurich

MEYER, HERMAN C. H., 1934 (1968), Associate Professor Emeritus of Germanic Languages; B.A., 1924, Capital; Ph.D., 1936, Chicago

MICHAEL, ERNEST ARTHUR,\* 1953 (1960), Professor of Mathematics; B.A., 1947, Cornell; M.A., 1948, Harvard; Ph.D., 1951, Chicago

MICKLESEN, LEW R.,\* 1953 (1969), Professor of Slavic Linguistics and Russian and East European Studies; B.S., 1942, Minnesota; Ph.D., 1951, Harvard

MIDDAUGH, DAN G., 1967 (1969), Lecturer in Oral Biology and Community Dentistry; Assistant Dean for Clinical Affairs, School of Dentistry; Assistant Director, Center for Research in Oral Biology; B.S., 1955, D.D.S., 1961, Minnesota

MIGNON, EDMOND,\* 1970, Assistant Professor of Librarianship; B.A., 1951, M.A., 1952, Syracuse; M.Libr., 1959, Washington

MILCZEWSKI, MARION A.,\* 1967, Professor of Librarianship; Director of Libraries; A.B., 1936, Michigan; B.S.L.S., 1938, M.S., 1940, Illinois

MILLAR, DAVID G., 1973, Associate Professor of Law; A.B., 1963, Stanford; J.D., 1966, New York

MILLER, ALAN D.,\* 1967 (1968), Assistant Professor of Ceramic Engineering; B.S. in Cer.E., 1957, Ph.D., 1967, Washington

MILLER, BRUCE STUART, 1971, Senior Research Associate in Fisheries; B.A. in Zoology, 1958, Grinnell; M.S., 1965, Ph.D., 1969, Washington

MILLER, CHARLES J., 1927 (1945), Professor Emeritus of Marketing; B.B.A., 1922, M.B.A., 1927, Washington

MILLER, DONALD H.,\* 1970, Associate Professor of Urban Planning; B.A., 1958, Chicago; M.C.P., 1960, California (Berkeley); Fulbright Scholar, 1961, Technical University, The Netherlands; Ph.D., 1973, California (Berkeley)

MILLER, DORIS IDA, 1973, Assistant Professor of Physical Education; B.P.H.E., 1961, Toronto; M.A., 1964, Oregon; Ph.D., 1970, Pennsylvania State MILLER, EARL B.,\* 1969 (1971), Associate Professor of Art; Akademie der Bildenden Kunste (Munich)

MILLER, ERNEST G.,\* 1965 (1971), Associate Professor of Public Affairs; Director, Continuing Education, Graduate School of Public Affairs; A.B., 1951, Whitman; M.P.A., 1953, Washington; Ph.D., 1959, Princeton

MILLER, J. JAY, 1973, Assistant Professor of Anthropology; B.A., 1969, New Mexico; Ph.D., 1972, Rutgers

MILLER, JOSEF M.,\* 1968 (1972), Associate Professor of Otolaryngology and Physiology and Biophysics; B.A., 1961, California; Ph.D., 1965, Washington

MILLER, ROGER LEROY,\* 1968 (1972), Associate Professor of Economics; A.B., 1965, California (Berkeley); Ph.D., 1968, Chicago

MILLER, ROY ANDREW,\* 1970 (1971), Professor and Chairman of Asian Languages and Literature; Professor of East Asian Studies; B.A., 1946, Gustavus Adolphus; M.A., 1950, Ph.D., 1953, Columbia

MILLER, SIDNEY,\* 1965 (1969), Associate Professor of Social Work; B.S., 1951, M.S., 1953, Columbia

MILLER, WILLIAM M.,\* 1951 (1959), Associate Professor of Civil Engineering; B.S. in C.E., 1951, M.S. in C.E., 1952, Washington

MILLIS, ALBERT J. T., 1971, Research Instructor in Pediatrics; B.A., 1965, Pennsylvania State; Ph.D., 1971, Pennsylvania

MILLS, BLAKE DAVID, JR.,\* 1946 (1947), Professor of Mechanical Engineering; B.S. in M.E., 1934, B.S. in E.E., 1934, Washington; M.S. in M.E., 1935, Massachusetts Institute of Technology; M.E., 1947, Washington

MILLS, CASWELL A.,\* 1942 (1961), Associate Professor of Physical Education; Adjunct Associate Professor of Health Services; B.A., 1935, North Dakota State Teachers; M.A., 1943, Ph.D., 1959, Washington

MILNER, JOHN E.,\* 1965 (1972), Associate Professor of Environmental Health; Adjunct Professor of Medicine; B.S., 1952, United States Military Academy; M.D., 1961, Washington

MILUTINOVIC, JOVAN, 1970 (1972), Instructor in Medicine; M.D., 1953, Med. Faculty of Zagreb, Yugoslavia

MINCKLER, TATE M., 1971, Associate Professor of Laboratory Medicine; Head, Computer Division; B.A., 1955, Reed; M.D., 1959, Oregon

MINER, ADAH L.,\* 1965 (1973), Professor of Speech; B.A., 1943, M.A., 1948, Washington; Ph.D., 1962, Wisconsin

MINIFIE, FRED D.,\* 1971, Professor of Speech; B.A., 1958, Linfield; M.A., 1962, Ph.D., 1963, Iowa

MISCH, PETER,\* 1947 (1950), Professor of Geological Sciences; D.Sc., 1932, Goettingen (Germany)

MISH'ALANI, JAMES K.,\* 1963, Assistant Professor of Philosophy; A.B., 1956, American University of Beirut; M.A., 1958, Ph.D., 1961, Brown

MITCHELL, HERMAN E., 1973, Acting Assistant Professor of Psychology; B.A., 1968, Cincinnati; M.S., 1970, Purdue

MITCHELL, TERENCEROBERT, \* 1969 (1972), Associate Professor of Management and Organization; Adjunct Associate Professor of Psychology; A.B., 1964, Duke; M.A., 1967, Michigan

MITCHELL, WILLIAM B., 1969 (1972), Assistant Professor of Medicine and Health Ser-

FACULTY INDEX



vices; B.S., 1960, Idaho; M.D., 1964, M.S.P.M., 1971, Washington

MITHUN, OMER,\* 1947 (1969), Professor of Architecture; B.Arch., 1942, Minnesota

MITTET, HOLGER P.,\* 1946 (1955), Associate Professor of Civil Engineering; Associate Chairman, Department of Civil Engineering; B.S. in C.E., 1937, Washington; M.S. in C.E., 1938, Massachusetts Institute of Technology

MIYAMOTO, S. FRANK,\* 1941 (1964), Professor of Sociology; B.A., 1936, M.A., 1938, Washington; Ph.D., 1950, Chicago

MOBLEY, JOYCE DOLORES, 1970, Lecturer in English and Drama; B.A., 1962, Florida A&M; M.A., 1963, California (Los Angeles)

MODELSKI, GEORGE,\* 1967, Professor of Political Science; B.Sc., 1950, Ph.D., 1954, London

MOE, ROGER E.,\* 1967 (1971), Associate Professor of Surgery; B.S., 1952, M.D., 1959, Washington

MOFFETT, BENJAMIN C.,\* 1964 (1968), Professor of Orthodontics (Anatomy); A.B., 1948, Syracuse; Ph.D., 1952, New York

MOHRI, HITOSHI, 1968 (1971), Associate Professor of Surgery; M.D., 1955, Dr. Med. Sci. (Ph.D.), 1962, Tohoku

MOINPOUR, REZA,\* 1969, Assistant Professor of Marketing; B.Sc., 1965, M.B.A., 1966, Ph.D., 1970, Ohio State

MOLLER, RICHARD C., 1970, Instructor in Restorative Dentistry; D.D.S., 1970, Washington

MONDA, GEORGE D., 1966, Instructor in Urology; B.A., 1954, St. Martin's; M.D., 1958, St. Louis

MONK, GEORGE STEVEN,\* 1964 (1973), Associate Professor of Mathematics; B.A., 1959, Harvard; Ph.D., 1964, Minnesota

MONSEN, ELAINE R.,\* 1963 (1973), Associate Professor of Home Economics; Lecturer in Medicine; B.A., 1956, Utah; M.S., 1959, Ph.D., 1961, California (Berkeley)

MONSEN, R. JOSEPH,\* 1963 (1966); Professor and Chairman of Business, Government, and Society; B.S., 1953, Utah; M.A., 1954, Stanford; Ph.D., 1960, California (Berkeley)

MONSON, DIANNE L.,\* 1966 (1969), Associate Professor of Education; B.S., 1956, M.A., 1962, Ph.D., 1966, Minnesota

MOORE, ALTON W.,\* 1948 (1951), Professor of Orthodontics; Associate Dean, School of Dentistry; D.D.S., 1941, California; M.S., 1948, Illinois

MOORE, JOHN TERENCE,\* 1948 (1964), Associate Professor of Music; Director, School of Music; B.Mus., 1940, M.Mus., 1941, Illinois

MOORE, ROBERT T.,\* 1968, Associate Professor of Mathematics; B.A., 1960, Swarthmore; Ph.D., 1964, Princeton

MOREL, ANNE C.,\* 1960 (1961), Associate Professor of Mathematics; B.A., 1941, California (Los Angeles); Ph.D., 1953, California (Berkeley)

MORFORD, WALTER ROBERT,\* 1971, Professor of Physical Education; Director, School of Physical and Health Education; B.P.E., 1956, M.A., 1959, British Columbia; Ed.D., 1964, California (Berkeley)

MORGAN, ALBERT F.,\* 1966 (1972), Associate Professor of Oral Biology; D.D.S., 1956, New York

MORGAN, BEVERLY C., 1962 (1973), Professor and Chairman of Pediatrics; M.D., 1955, Duke MORGAN, JOANN, 1969, Instructor in Dental Hygiene; B.S., 1969, Washington

MORGAN, THOMAS E., JR., 1962 (1973), Professor of Medicine; B.S., 1950, M.D., 1954, Duke

MORISHIMA, JAMES K., 1972, Associate Professor of Education; Director, Institutional Educational Research; B.S., 1962, Ph.D., 1967, Washington

MORISON, IAN GEORGE, 1972, Research Associate Professor; B.Sc.For., 1950, Western Australia; Dip. For., 1952, Australian Forestry School; Ph.D., 1970, Washington

MORITZ, WILLIAM E., 1973, Research Assistant Professor of Electrical Engineering and Bioengineering; B.Aero.E., 1965, Rensselaer Polytechnic Institute; M.S., 1966, Ph.D., 1969, Stanford

MORIYASU, KEIHACHIRO,\* 1971 (1973), Assistant Professor of Physics; B.S., 1962, Massachusetts Institute of Technology; Ph.D., 1967, California (Berkeley)

MORRILL, RICHARD L.,\* 1961 (1969), Professor and Chairman of Geography; Professor of Environmental Studies; B.A., 1955, Dartmouth; M.A., 1957, Ph.D., 1959, Washington

MORRIS, ARVAL,\* 1955 (1961), Professor of Law; B.A., 1951, Colorado College; M.A., 1952, J.D., 1955, Colorado; LL.M., 1958, Yale; LL.D., 1972, Colorado College

MORRIS, DAVID R.,\* 1966 (1970), Associate Professor of Biochemistry; A.B., 1961, California (Los Angeles); Ph.D., 1964, Illinois

MORRIS, MORRIS DAVID,\* 1949 (1961), Professor of Economics and South Asian Studies; A.B., 1941, Ph.D., 1954, California (Berkeley)

MORRISON, JAMES BRYAN,\* 1946 (1961), Professor of Mechanical Engineering; B.S. in M.E., 1943, Virginia Polytechnic Institute; M.S. in M.E., 1954, Washington

MORRISON, KENNETH N.,\* 1948 (1965), Professor and Chairman of Restorative Dentistry; D.D.S., 1943, Toronto; M.S.D., 1952, Washington

MORRISON, WINSOR V., 1966 (1967), Lecturer in Otolaryngology; Deputy Chief, Department of Otolaryngology, United States Public Health Service Hospital; A. B., 1953, B.S., 1955, Missouri; M.D., 1957, Tennessee

MORROW, JAMES ALLEN, JR.,\* 1969 (1973), Associate Professor of Mathematics; B.S., 1963, California Institute of Technology; Ph.D., 1967, Stanford

MOSELEY, SPENCER,\* 1948 (1965) Professor of Art; Director, School of Art; B.A., 1948, M.F.A., 1951, Washington

MOSHER, MICHAEL A., 1973, Acting Assistant Professor of Political Science; B.A., 1966, California (Berkeley); M.A., 1970, Harvard

MOSHER, PAUL H.,\* 1966 (1969), Assistant Professor of History; B.A., 1961, Portland State; M.A., 1962, Ph.D., 1969, California (Berkeley)

MOSS, NED S., 1969 (1973), Research Assistant Professor of Pathology; B.S., 1951, City College, New York; M.D., 1955, New York

MOTTET, N. KARLE,\* 1959 (1964), Professor of Pathology; Chief, Pathology Service, University Hospital; B.S., 1948, Washington State; M.D., 1952, Yale

MOTULSKY, ARNO G.,\* 1953 (1961), Professor of Medicine and Genetics; B.S., 1945, M.D., 1947, Illinois

MOULTON, R. WELLS,\* 1941 (1950), Professor and Chairman' of Chemical Engineering; Dean, Joint Center for Graduate Study; Associate Dean, Graduate School; B.S.Ch.E., 1932, M.S.Ch.E., 1934, Ph.D., 1938, Washington

MOXON, RICHARD W., 1971, Assistant Professor of International Business; B.S., 1963, M.S., 1964, Stanford; D.B.A., 1973, Harvard

MUELLER, FRED J.,\* 1956 (1967), Professor of Accounting; B.A., 1953, M.A., 1954, Washington; Ph.D., 1956, Ohio State; C.P.A., State of Washington

MUELLER, GERHARD G.,\* 1960 (1967), Professor and Chairman of Accounting; B.S., 1956, M.B.A., 1957, Ph.D., 1961, California (Berkeley)

MUELLER, JAMES I.,\* 1949 (1955), Professor of Ceramic Engineering; Head, Division of Ceramic Engineering; B.Cer.E., 1939, Ohio State; Ph.D., 1949, Missouri

MUHLICK, CLARENCE VICTOR, 1948 (1952), Lecturer Emeritus in Botany; B.S., 1933, Montana

MUND, VERNON A.,\* 1932 (1948), Professor of Economics; B.B.A., 1928, M.B.A., 1929, Washington; Ph.D., 1932, Princeton

MUNDT, LENORA B.,\* 1963 (1965), Associate Professor of Social Work; B.S., 1944, Certificate of Social Work, 1946, Utah; M.S.W., 1950, Washington

MUNRO, KATHLEEN, 1929 (1962), Professor Emeritus of Music; B.M., 1924, Washington; M.A., 1929, Columbia; Ph.D., 1937, Washington

MURANO, ROBERT, 1971, Lecturer in Radiology; B.S., 1960, Massachusetts Institute of Technology; M.S., 1966, Washington

MURDOCH, MARGARET BARR, 1959 (1965), Lecturer in Home Economics; B.S., 1935, Carnegie Institute of Technology; M.A., 1958, Columbia Teachers; M.Ed., 1969, Washington

MURDOCK, GERALD, 1972, Instructor in Restorative Dentistry; B.S., 1955, Puget Sound; D.D.S., 1959, Washington

MURPHY, HERTA A., 1946 (1971), Professor of Business Communications; B.B.A., 1930, M.A., 1942, Washington

MURPHY, JAMES LESTER,\* 1967 (1968), Associate Professor of Forest Fire Science; B.S., 1958, M.S., 1959, Utah State; Ph.D., 1965, Michigan

MURPHY, STANLEY R.,\* 1953 (1968), Professor of Oceanography and Mechanical Engineering; Director, Marine Resources; Adjunct Professor of Institute for Marine Studies; B.A., 1948, Fresno State; Ph.D., 1959, Washington

MURPHY, TERENCE M., 1968 (1971), Assistant Professor of Anesthesiology; M.B., Ch.B., Liverpool (England)

MURRAY, JOHN A., 1965 (1973), Associate Professor of Medicine; B.S., 1957, Colorado State; M.D., 1961, Baylor

# Ν

NAKAGAWA, HELEN,\* 1968 (1971), Associate Professor of Psychosocial Nursing; B.S., 1950, Colorado; M.A., 1956, Columbia; Ph.D., 1968, California (Los Angeles)

NAKATANI, ROY EIJI,\* 1964 (1973), Professor of Fisheries; Assistant Director, Fisheries Research Institute; Program Director, Living Research, Division of Marine Resources; B.S., 1947, Ph.D., 1960, Washington

NAMEROFF, MARK A.,\* 1970, Assistant Professor of Biological Structure; B.A., 1960, M.D., 1965, Ph.D., 1966, Pennsylvania NAMIOKA, ISAAC,\* 1963 (1968), Professor of Mathematics; B.A., 1951, Ottawa; M.A., 1953, Kansas; Ph.D., 1956, California (Berkeley)

NAPPEN, DENNIS L., 1973, Instructor in Oral Diagnosis; D.D.S., 1971, Washington

NARAYANAN, A. SAMPATH, 1971, Research Associate in Pathology; B.Sc., 1961, M.Sc., 1963, Ph.D., 1967, Madras University (India)

NARVER, JOHN C.,\* 1966 (1972), Professor of Marketing; Chairman, Department of Marketing, Transportation, and International Business; B.S., 1957, Oregon State; M.B.A., 1960, Ph.D., 1965, California (Berkeley)

NASH, HELEN T., 1972, Associate Professor of Psychiatry and Behavioral Sciences; B.A., 1942, Spelman; Ph.D., 1970, Wisconsin

NASON, JAMES D.,\* 1970, Assistant Professor of Anthropology; Curator of Ethnology, Burke Memorial-Washington State Museum; B.A., 1964, California (Riverside); M.A., 1967, Ph.D., 1970, Washington

NATKIN, EUGENE,\* 1962 (1967), Professor and Chairman of Endodontics; A. B., 1953, Columbia; D.D.S., 1957, New York; M.S.D., 1962, Washington

NAUM, YVONNE, 1972, Research Instructor in Medicine and Biological Structure; B.A., 1953, Hunter; M.A., 1955, Ph.D., 1961, Columbia

NECE, RONALD E.,\* 1959 (1967), Professor of Civil Engineering; B.S. in C.E., 1949, Washington; M.S. in C.E., 1951, Lehigh; Sc.D., 1958, Massachusetts Institute of Technology

NEDDERMEYER, SETH HENRY, 1946 (1952), Professor Emeritus of Physics; B.A., 1929, Stanford; Ph.D., 1935, California Institute of Technology

NEEL, RICHARD S., 1972, Assistant Professor of Education; A.B., 1964, California (Los Angeles); M.S., 1971, Ph.D., 1972, Southern California

NEIMAN, PAUL E., 1968 (1971), Assistant Professor of Medicine; B.A., 1960, M.D., 1964, Washington

NELP, WIL B.,\* 1962 (1971), Professor of Medicine and Radiology; B.A., 1951, Franklin; M.D., 1955, Johns Hopkins

NELSON, JANET S. R., 1972, Research Assistant Professor of Radiology; B.S., 1964, Michigan; M.S., 1965, Oregon State; Ph.D., 1970, Oregon

NELSON, JEROLD A., 1971, Assistant Professor of Librarianship; B.A., 1959, M.A., 1964, Minnesota; Ph.D., 1971, California (Berkeley)

NELSON, OLIVER WENDELL, 1945 (1969), Associate Professor Emeritus of Speech; B.A., 1933, M.A., 1939, Ph.D., 1949, Washington

NELSON, THOMAS O.,\* 1971, Assistant Professor of Psychology; B.A., 1965, Trenton State; M.A., 1966, Ph.D., 1970, Illinois

NELSON, WENDEL,\* 1965 (1970), Associate Professor of Pharmaceutical Chemistry; B.S., 1962, Idaho State; Ph.D., 1965, Kansas

NESS, MAHLON O., 1964, Assistant Professor of Aeronautics and Astronautics; B.S. in A.E., 1957, Washington; M.S. in A.E., 1958, Southern California

NESTER, EUGENE W.,\* 1962 (1972), Professor of Microbiology; Adjunct Professor of Genetics; B.S., 1952, Cornell; Ph.D., 1959, Western Reserve

NEURATH, HANS,\* 1950, Professor and Chairman of Biochemistry; Ph.D., 1933, Vienna

NEVISSI, AHMAD, 1973, Research Associate in Fisheries; B.S., 1959, Tehran; M.S., 1966,

Technische Hochschule Hannover; Ph.D., 1973, Arkansas

NEWELL, LAURA L.,\* 1966 (1972), Associate Professor of Orthodontics and Anthropology; B.A., 1954, New Mexico; M.A., 1957, Northwestern; Ph.D., 1967, Washington

NEWELL, WILLIAM T.,\* 1960 (1969), Professor of Management and Operations Systems; B.S., 1952, Colorado; M.B.A., 1955, Denver; Ph.D., 1962, Texas

NEWMAN, DAVID S., 1972, Affiliate Assistant Professor of Biostatistics; B.S., 1956, New Mexico; Ph.D., 1963, Cornell

NEWMAN, JOAN A., 1972, Research Associate in Nursing; B.A., 1953, Wellesley; M.A., 1971, Oregon

NEWMAN, MARSHALL T.,\* 1966, Professor of Anthropology; Adjunct Professor of Environmental Studies; Ph.B., 1933, M.A., 1935, Chicago; Ph.D., 1941, Harvard

NEWMEYER, FREDERICK J.,\* 1969, Assistant Professor of Linguistics; B.A., 1965, M.A., 1967, Rochester; Ph.D., 1969, Illinois

NICHOLLS, JACK I., 1965, Associate Professor of Restorative Dentistry; B.E., 1957, Auckland; M.S., 1960, British Columbia; Ph.D., 1966, Purdue

NICHOLSON, CLYDE G., 1971, Assistant Professor of Rehabilitation Medicine; M.B., B.S., 1953, Bartholomew's Hospital (England)

NIHAN, NANCY L., 1974, Associate Professor of Civil Engineering; B.S. in I.E., 1964, M.S. in C.E., 1967, Ph.D., 1970, Northwestern

NILAND, MAUREEN B., 1970 (1973), Assistant Professor of Family and Community Nursing; Diploma, 1961, De Paul Hospital School of Nursing, Virginia; B.S., 1968, Arizona State; M.S., 1970, California (San Francisco)

NILSEN, THOMAS R.,\* 1946 (1963), Associate Professor and Chairman of Speech; B.A., 1940, M.A., 1948, Washington; Ph.D., 1953, Northwestern

NIWA, TAMAKO,\* 1962 (1965), Associate Professor of Japanese and East Asian Studies; B.S., 1944, M.A., 1946, Ph.D., 1956, Radcliffe

NIX, MARTHA JEANETTE, 1928 (1961), Assistant Professor Emeritus of English; B.A., 1922, M.A., 1925, Washington

NOE, JERRE D.,\* 1968, Professor of Electrical Engineering and Computer Science; Chairman, Computer Science Group; B.S., 1943, California (Berkeley); Ph.D., 1948, Stanford

NOGES, ENDRIK,<sup>\*</sup> 1958 (1969), Professor of Electrical Engineering; B.S. in E.E., 1954, M.S. in E.E., 1956, Ph.D., 1959, Northwestern.

NOLEN, PATRICIA A., 1971 (1973), Assistant Professor of Education; B.S., 1964, M.S., 1968, Ph.D., 1970, Washington

NORMAN, JERRY,\* 1971, Assistant Professor of Chinese and East Asian Studies; B.A., 1962, Chicago; M.A., 1965, Ph.D., 1969, California (Berkeley)

NORMAN, JOSEPHUS G., JR.,\* 1972, Assistant Professor of Chemistry; B.A., 1969, Rice; Ph.D., 1972, Massachusetts Institute of Technology

NORNANG, NAWANG L., 1963, Lecturer in Tibetan; Geshe (Doctorate in Buddhist Philosophy), 1959, Shadrupling, Tibet

NORRIS, CHARLES H., 1962 (1972), Professor Emeritus of Civil Engineering; Dean Emeritus, College of Engineering; B.S. in C.E., 1931, Washington; S.M. in C.E., 1932, Sc.D. in S.E., 1942, Massachusetts Institute of Technology NORRIS, H. THOMAS,\* 1967, Associate Professor of Pathology; B.S., 1956, Washington State; M.D., 1959, Southern California

NORRIS, RICHARD E.,\* 1963 (1969), Professor of Botany; B.S., 1947, Washington; Ph.D., 1954, California (Berkeley)

NORTH, DOUGLASS C.,\* 1950 (1960), Professor and Chairman of Economics; B.A., 1942, Ph.D., 1952, California (Berkeley)

NORTHROP, CURTIS H., 1972, Instructor in Radiology; B.S., 1962, Massachusetts Institute of Technology; M.D., 1966, Washington

NORTHWOOD, LAWRENCE K.,\* 1959, Professor of Social Work; B.A., 1947, Wayne State; Ph.D., 1953, Michigan

NORTON, THOMAS J.,\* 1961 (1969), Associate Professor of Urban Planning; B.A., 1949, M.U.P., 1960, Washington

NOSTRAND, HOWARD LEE,\* 1939, Professor of French Language and Literature; B.A., 1932, Amherst; M.A., 1933, Harvard; Docteur, 1934, Universite de Paris

NOTTELMANN, RUDOLPH H., 1927 (1961), Professor Emeritus of Law; B.A., 1912, LL.D., 1952, Monmouth; M.A., 1913, Illinois; LL.B., 1922, Yale

NOVIKOW, ELIAS T., 1947 (1971), Lecturer Emeritus in Russian Language; B.M., 1939, Oklahoma; M.M., 1942, Michigan; M.A., 1946, Washington

NUNKE, RONALD JOHN,\* 1958 (1968), Professor of Mathematics; B.S., 1950, M.S., 1951, Ph.D., 1955, Chicago

NUTTER, JANET Y., 1968, Associate in Pediatrics; B.S., 1941, Kansas State

NYBERG, FOLKE, 1969, Lecturer in Architecture; B.A., 1957, B.Arch., 1960, Yale

NYQUIST, JOANNE L., 1969, Lecturer in Speech; B.A., 1960, M.A., 1967, Washington

# 0

OATES, GORDON,\* 1967 (1970), Professor of Aeronautics and Astronautics; B.A.Sc., 1954, British. Columbia; M.Sc., 1956, Birmingham (England); Ph.D., 1959, California Institute of Technology

OBENCHAIN, DEAN F., 1971, Instructor in Surgery; B.S., 1958, College of Idaho; B.S., 1960, South Dakota; M.D., 1962, Washington

OBERG, ARTHUR KENNETH,\* 1968 (1971), Associate Professor of English; A.B., 1960, Columbia; A.M., 1961, Ph.D., 1966, Harvard

OCHOA, GREGORY J.,\* 1972, Assistant Professor of Social Work; Adjunct Assistant Professor of Health Services; A.B., 1966, San Fernando Valley State; M.S.W., 1968, Southern California

OCHS, HANS DIETER, 1969 (1972), Assistant Professor of Pediatrics; M.D., 1962, Freiburg

ODLAND, GEORGE F., 1955 (1969), Professor of Medicine and Biological Structure; Head, Dermatology; M.D., 1946, Harvard

O'DOAN, NEAL, 1966 (1970), Associate Professor of Music; B.Mus., 1959, M.M., 1961, University of the Pacific

OGILVIE, ALFRED L.,\* 1948 (1965), Professor of Periodontics; D.D.S., 1944, Toronto; M.S., 1948, California

OGILVIE, JAMES T., 1966 (1972), Assistant Professor of Medicine; Director, Model Cities; B.A., 1959, Colorado; M.D., 1963, Harvard



OJEMANN, GEORGE A., 1966 (1971), Associate Professor of Neurological Surgery; B.A., 1956, M.D., 1959, Iowa State

O'KEEFE, KATHLEEN B., 1969, Lecturer and Academic Counselor in Mathematics; A.B., 1946, M.A., 1948, Ph.D., 1959, California (Berkeley)

OLCH, DORIS,\* 1969 (1973), Associate Professor of Education; B.A., 1943, M.A., 1945, Buffalo; Ph.D., 1968, Washington

OLCOTT, VIRGINIA, 1931 (1968), Associate Professor Emeritus; Diploma, 1926, Peter Bent Brigham Hospital, Boston; B.S., 1927, M.S., 1931, Certificate in Public Health Nursing, 1949, Washington

O'LEARY, MICHAEL, 1972, Instructor in Psychiatry and Behavioral Sciences; B.A., 1967, Sonoma State; Ph.D., 1972, Washington State

OLESEN, DOUGLAS E., 1973, Affiliate Professor of Civil Engineering; B.S. in C.E., 1962, M.S. in C.E., 1963, Ph.D., 1972, Washington

OLSGAARD, RICHARD, 1962 (1966), Associate in Biochemistry; B.A., 1951, Concordia; M.S., 1957, North Dakota State

OLSTAD, ROGER GALE,\* 1964 (1971), Professor of Education; Associate Dean, College of Education; B.S., 1955, M.A., 1959, Ph.D., 1963, Minnesola

OMENN, GILBERT S., 1969 (1971), Assistant Professor of Medicine, A.B., 1961, Princeton; M.D., 1965, Harvard

O'NEIL, SALLY M.,\* 1971, Assistant Professor of Maternal and Child Nursing; Diploma, 1958, Mary Hitchcock Memorial Hospital School of Nursing; B.S., 1960, St. Anselm's; M.A., 1965, New York; M.A., 1970, Ph.D., 1971, Kansas

ONOUYE, BARRY, 1969 (1972), Assistant Professor of Architecture; B.S., 1967, Hawaii; M.S., 1969, Washington

OPPERMAN, HAL,\* 1967 (1972), Assistant Professor of Art and History; B.A., 1960, Knox; M.A., 1963, Ph.D., 1972, Chicago

ORDAL, ERLING J.,\* 1937 (1957), Professor of Microbiology; Adjunct Professor of Fisheries; A.B., 1972, Luther; Ph.D., 1936, Minnesota

ORIANS, GORDON H.,\* 1960 (1968), Professor of Zoology; B.S., 1954, Wisconsin; Ph.D., 1960, California (Berkeley)

OSBORN, ROBERT BLAIR,\* 1968, Assistant Professor of Mechanical Engineering; A.B., 1960, Dartmouth; M.S., 1964, California (Berkeley); Ph.D., 1967, Washington

OSBORNE, OLIVER H.,\* 1969, Associate Professor and Chairman of Psychosocial Nursing; Lecturer in Anthropology; B.S., 1958, Hunter; M.A., 1960, New York; Ph.D., 1968, Michigan State

OSHIKAWA, SADAOMI,\* 1966 (1970), Associate Professor of Marketing; B.A., 1952, Waseda University (Tokyo); M.S., 1957, Colorado; Ph.D., 1965, Washington

OSTERUD, KENNETH L.,\* 1949 (1966), Associate Professor of Zoology; B.A., 1935, Randolph-Macon; Ph.D., 1941, New York

OSTLUND, LYLE E., 1950 (1965), Associate Professor of Restorative Dentistry; B.S., D.M.D., 1947, Oregon

OSTRANDER, KENNETH H.,\* 1968 (1972), Associate Professor of Education; B.S., 1957, M.S., 1959, Purdue; M.P.A., 1965, Kansas; Ed.D., 1968, Tennessee

OTTENBERG, SIMON,\* 1955 (1966), Professor of Anthropology and African Studies; Adjunct Curator, Washington State Museum; B.A., 1948, Wisconsin; Ph.D., 1957, Northwestern

OWENS, JAMES W. M., 1963 (1972), Lecturer in Pediatrics; B.A., 1956, Cornell; M.D., 1960, State University of New York

OZENNE, TIMOTHY O., 1971 (1973), Assistant Professor of Economics; B.A., 1966, Ph.D., 1972, California (Los Angeles)

OZOLS, VILNIS,\* 1968, Assistant Professor of Mathematics; B.S., 1962, Iowa State; M.A., 1965, Ph.D., 1967, California (Berkeley)

# P

PACE, ANTONIA,\* 1967, Professor of Italian Language and Literature; A.B., 1935, M.A., 1937, Syracuse; Ph.D., 1943, Princeton

PACKARD, THEODORE T., 1969 (1972), Research Assistant Professor of Oceanography; B.S., 1963, Massachusetts Institute of Technology; M.S., Ph.D., 1969, Washington

PAGANO, ROBERT R.,\* 1965, Assistant Professor of Psychology; B.E.E., 1956, Rensselaer Polytechnic Institute; M.S., 1964, Ph.D., 1966, Yale

PAGE, ALFRED N.,\* 1965 (1973) Professor of Business Economics and Quantitative Methods; Chairman, Department of Finance, Business Economics, and Quantitative Methods; Director of Publications, Graduate School of Business Administration; B.S., 1959, Macalester; M.B.A., 1962, Ph.D., 1964, Chicago

PAGE, BENJAMIN F.,\* 1966 (1971), Associate Professor of Librarianship; A.B., 1949, Ripon; M.A.L.S., 1954, Wisconsin

PAGE, ROY C.,\* 1964 (1970), Associate Professor of Pathology and Periodontics; Affiliate of Center for Research on Oral Biology; A.B., 1953, Berea; D.D.S., 1957, Maryland; Ph.D., 1967, Washington

PAHN, -VADIM O., 1946 (1953), Lecturer in Russian Language; B.A., 1935, B.S., 1938, British Columbia

PAINE, ROBERT T., JR.,\* 1962 (1971), Professor of Zoology; A.B., 1954, Harvard; M.S., 1958, Ph.D., 1961, Michigan

PALAIS, JAMES B.,\* 1968, Assistant Professor of History and East Asian Studies; B.A., 1955, Harvard; M.A., 1960, Yale; Ph.D., 1968, Harvard

PALKA, JOHN M.,\* 1969 (1972), Associate Professor of Zoology; B.A., 1960; Swarthmore; Ph.D., 1965, California (Los Angeles)

PALKA, YVONNE S.,\* 1970 (1972), Assistant Professor of Zoology; B.A., 1960, Swarthmore; M.A., 1963, Ph.D., 1965, California (Los Angeles)

PALMER, JOHN M.,\* 1952 (1963), Associate Professor of Speech and Prosthodontics; B.A., 1946, M.A., 1950, Washington; Ph.D., 1952, Michigan

PALOMO, DOLORES JOSEPHINE, 1971 (1972); Assistant Professor of English; B.A., 1952, Southern California; M.A., 1966, Wayne State; Ph.D., 1972, State University of New York

PARK, HAN Z., 1973, Research Assistant Professor of Biological Structure; B.S., 1955, Seoul National; M.A., 1965, Vanderbilt; Ph.D., 1969, Rice

PARKER, ROBERT G., 1959 (1966), Professor of Radiology; B.S., 1946, M.D., 1948, Wisconsin

PARKHURST, DALE J., 1969, Lecturer in Microbiology; B.S., 1960, Washington

PARKS, GEORGE K.,\* 1971 (1973), Associate Professor of Geophysics; Adjunct Associate Pro-

fessor of Atmospheric Sciences and Physics; B.A., 1961, Ph.D., 1966, California (Berkeley)

PARKS, RICHARD W.,\* 1970, Associate Professor of Economics; A.B., 1960, Harvard; M.A., 1964, Ph.D., 1966, California (Berkeley)

PARMERTER, R. REID,\* 1963 (1971), Associate Professor of Aeronautics and Astronautics; B.S., 1958, M.S., 1959, Ph.D., 1964, California Institute of Technology

PARRISH, DANIEL G., 1954 (1967), Research Associate in Medicine; B.S., 1951, Pennsylvania State

PARSON, WILLIAM W.,\* 1967 (1971), Associate Professor of Biochemistry; A.B., 1961, Harvard; Ph.D., 1965, Western Reserve

PASCAL, PAUL,\* 1953 (1963), Associate Professor of Classics; B.A., 1948, Vermont; Ph.D., 1953, North Carolina

PATRICK, MAXINE L., 1955 (1973), Professor and Chairman of Physiological Nursing; B.S., 1948, Colorado; M.N., 1953, Washington; D.P.H., 1970, California (Los Angeles)

PATTEN, SIDNEY R., 1972, Instructor in Oral Diagnosis; D.D.S., 1970, Washington

PATTERSON, VIOLA HANSEN, 1947 (1968), Associate Professor Emeritus of Art; B.A., 1921, B.S., B.F.A., 1925, M.F.A., 1947, Washington

PATTI, RINO J.,\* 1967, Associate Professor of Social Work; B.A., 1958, San Diego State; M.S.W., 1960, D.S.W., 1967, Southern California

PATTON, HARRY D.,\* 1947 (1966), Professor and Chairman of Physiology and Biophysics; B.A., 1939, Arkansas; Ph.D., 1943, M.D., 1946, Yale

PAULSEN, C. ALVIN, 1958 (1970), Professor of Medicine; B.A., 1947, M.D., 1952, Oregon

PAVLIN, EDWARD G., 1973, Instructor in Anesthesiology; B.Sc., 1961, M.D., 1968, B.Sc., 1968, Manitoba

PAVLOU, SPYROS P., 1970 (1973), Research Assistant Professor of Oceanography; B.S., 1963, California (Los Angeles); M.S., 1965, San Diego State; Ph.D., 1970, Washington

PAWULA, KENNETH J.,\* 1965 (1967), Assistant Professor of Art; B.F.A., 1959, Illinois; M.A., 1962, California

PAYNE, NEIL F., 1973, Research Assistant Professor of Forest Resources; B.A., 1961, Wisconsin; M.S., 1964, Virginia Polytechnic Institute; Ph.D., 1973, Utah State

PEALY, ROBERT H.,\* 1967, Professor of Public Affairs; Director, Institute of Governmental Research; B.S., 1937, Akron; M.P.A., 1952, Ph.D., 1956, Michigan

PEARCE, JOHN KENNETH, 1934 (1967), Professor Emeritus of Logging Engineering; B.S.F., 1921, Washington

PEARSALL, NANCY N.,\* 1971, Assistant Professor of Microbiology; B.S., 1963, M.S., 1965, Ph.D., 1967, Washington

PEARSON, CARL E.,\* 1967 (1968), Professor of Aeronautics and Astronautics and Mathematics; B.A.Sc., 1944, British Columbia; Ph.D., 1949, Brown

PEARSON, MARGARET, 1971, Instructor in Dental Hygiene; B.S., R.D.H., 1970, Washington

PEARSON, NOLAN EARL, 1972, Associate in Fisheries; B.S., 1957, M.S., 1960, Stanford

PEASE, OTIS A.,\* 1966, Professor of History; B.A., 1949, Ph.D., 1954, Yale PECK, CORNELIUS J.,\* 1954 (1958), Professor of Law; B.S., 1944, Certificate, 1945, LL.B., 1949, Harvard

PECKHAM, PERCY D.,\* 1968 (1971), Associate Professor of Education; B.A., 1949, M.A., 1955, Denver; Ph.D., 1968, Colorado

PEDEN, IRENE C.,\* 1961 (1971), Professor of Electrical Engineering; Associate Dean, College of Engineering; B.S. in E.E., 1947, Colorado; M.S., 1958, Ph.D., 1962, Stanford

PEDERSEN, GORDON W., 1970 (1971), Assistant Professor of Oral Surgery; D.D.S., 1954, Creighton; M.S.D., 1963, Baylor

PEEK, CLIFFORD L.,\* 1938 (1962), Associate Professor of Physical Education; B.S., 1929, Washington; M.A., 1931, Columbia

PELLEGRINI, ANGELO M., 1930 (1957), Professor Emeritus of English; B.A., 1927, Ph.D., 1942, Washington

PEMBER, DON R.,\* 1969 (1972), Associate Professor of Communications; B.A., 1964, M.A., 1966, Michigan State; Ph.D., 1969, Wisconsin

PENINGTON, RUTH ESTHER, 1928 (1951), Professor Emeritus of Art; B.F.A., 1927, M.F.A., 1929, Washington

PENUELAS, MARCELINO,\* 1963 (1967), Professor of Spanish Language and Literature; Chairman, Department of Romance Languages and Literature; B.A., 1934, M.Ed., 1940, M.A., 1945, Valencia; Ph.D., 1949, Madrid

PERKINS, WILLIAM D.,\* 1972, Assistant Professor of Biological Structure; B.S., 1961, Wisconsin State; Ph.D., 1970, Washington

PERRY, MARTHA A., 1972, Assistant Professor of Psychology; B.A., 1962, Oberlin; M.A., 1969, Ph.D., 1970, Syracuse

PERSON, HENRY AXEL, 1941 (1961), Associate Professor Emeritus of English; B.A., 1927, Ph.D., 1942, Washington

PETERS, PHILIP CARL,\* 1964 (1970), Associate Professor of Physics; B.S., 1960, Ph.D., 1964, California Institute of Technology

PETERSDORF, ROBERT G., 1959 (1964), Professor and Chairman of Medicine; B.A., 1948, Brown; M.D., 1952, Yale

PETERSEN, SUZANNE H., 1973, Acting Assistant Professor of Spanish Language and Literature; B.A., 1966, Mills; M.A., 1967, Wisconsin

PETERSON, DONALD R.,\* 1971, Professor of Epidemiology and International Health; B.A., 1944, Oregon State; M.S., 1946, M.D., 1947, Oregon; M.P.H., 1958, California (Berkeley)

PETERSON, JOHN C., 1967 (1972), Associate Professor and Chairman of Pedodontics; B.S., 1951, Washington State; D.M.D., 1955, M.S.D., 1961, Oregon

PETERSON, RICHARD B.,\* 1966 (1971), Associate Professor of Personnel and Industrial Relations; B.A., 1955; Augustana; M.A., 1956, Illinois; Ph.D., 1966, Wisconsin

PETRA, PHILIP H.,\* 1966 (1970), Assistant Professor of Obstetrics and Gynecology and Biochemistry; B.S., 1960, Ph.D., 1966, Tulane

PFLUG, A. EUGENE, 1966 (1969), Assistant Professor of Anesthesiology; B.S., 1949, M.D., 1952, Oregon

PHELPS, ROBERT RALPH,\* 1962 (1966), Professor of Mathematics; B.A., 1954, California (Los Angeles); Ph.D., 1958, Washington

PHILLIPS, LEON A., 1959 (1965), Associate Professor of Radiology; B.S., 1948, Washington; M.D., 1952, Yale PHILLIPS, THEODORE J., 1970 (1973), Professor and Chairman of Family Medicine; B.A., 1955, Swarthmore; M.D., 1959, Johns Hopkins

PHILLIPS, WILLIAM LOUIS,\* 1949 (1961), Associate Professor of English; Associate Dean, College of Arts and Sciences; B.A., 1942, Iowa State Teachers; M.A., 1947, Ph.D., 1949, Chicago

PICKERING, RUTH, 1971, Research Associate in Oral Biology; B.A., 1961, Oregon State; Ph.D., 1966, California

PIEHL, DE WAYNE J.,\* 1969, Assistant Professor of Business Policy and Operations Systems; A.B., 1953, M.B.A., 1957, Harvard

PIGOTT, GEORGE MORRIS,\* 1963 (1972), Professor of Fisheries; B.S., 1950, M.S., 1955, Ph.D., 1963, Washington

PIGOTT, WILLIAM,\* 1957 (1960), Associate Professor of Finance and Business Economics; B.S.S., 1949, Seattle University; M.A., 1955, Ph.D., 1957, Washington

PILAT, MICHAEL J.,\* 1967 (1973), Associate Professor of Air Resources Engineering in Civil Engineering; B.S. in Ch.E.C.E., 1960, M.S. in Ch.E.C.E., 1963, Ph.D., 1967, Washington

PINCUS, DAVID,\* 1969 (1970), Assistant Professor of Mathematics; B.A., 1964, Reed; A.M., 1965, Ph.D., 1969, Harvard

PINKNEY, DAVID H.,\* 1966, Professor of History; A.B., 1936, Oberlin; A.M., 1937, Ph.D., 1941, Harvard

PINTER, ROBERT B.,\* 1964, Assistant Professor of Electrical Engineering; B.S. in E.E., 1959, M.S., 1960, Marquette; Ph.D., 1964, Northwestern

PIOUS, DONALD A., 1964 (1969), Associate Professor of Pediatrics; A.B., 1952, M.D., 1956, Pennsylvania

PIPER, DAVID Z.,\* 1968 (1969), Assistant Professor of Oceanography; B.S., 1960, Kentucky; M.S., 1963, Syracuse; Ph.D., 1968, California (San Diego)

PIPES, PEGGY L., 1968 (1972), Lecturer in Home Economics; B.S., 1950, Texas Technological; M.A., 1952, Columbia Teachers; M.P.H., 1966, Michigan.

PITERNICK, LEONIE K., 1968, Lecturer in Biology; A.B., 1941, M.A., 1942, Ph.D., 1946, California (Berkeley)

PITTMAN, ROSEMARY J.,\* 1964 (1970), Associate Professor of Family and Community Nursing; B.S., 1940, Iowa; M.S., 1947, Chicago

PITTS, JANET A., 1972, Instructor in Physiological Nursing; B.S., 1968, Miami; M.N., 1969, Emory

PIZZUTO, EUGENE C.,\* 1957 (1966), Associate Professor of Art; B.A., 1950, Wisconsin; M.F.A., 1951, Cranbrook Academy of Art

PLEIN, ELMER M.,\* 1938 (1951), Professor of Pharmacy; Coordinator of Pharmaceutical Services, B.S., 1929, M.S., 1931, Ph.D., 1936, Colorado

PLEIN, JOY B., 1966 (1972), Associate Professor of Pharmacy; B.S., 1947, Idaho State; M.S., 1951, Ph.D., 1956, Washington

PLORDE, JAMES J.,\* 1966 (1971), Associate Professor of Medicine and Laboratory Medicine; B.A., B.S., 1955, M.D., 1959, Minnesota

POCKER, ANNA, 1963 (1969), Research Assistant Professor of Biochemistry; M.Sc., 1950, Hebrew University of Jerusalem; Ph.D., 1954, London (England) School of Hygiene and Tropical Medicine POCKER, YESHAYAU,\* 1961, Professor of Chemistry; M.S., 1949, Hebrew University of Jerusalem; Ph.D., 1953, University College (London); D.S., 1960, London

PODET, ALLEN H., 1969 (1970), Lecturer in Near Eastern Languages and Literature (Hebrew) and Near Eastern Studies; B.A., 1956, Illinois; B.H.L., 1958, M.A.H.L., 1962, D.H.L., 1964, Hebrew Union (Cincinnati)

POLLACK, GERALD H., 1968 (1973), Associate Professor of Anesthesiology and Bioengineering; B.S.E.E., 1961, Polytechnic Institute of Brooklyn; Ph.D., 1968, Pennsylvania

POLLACK, SYLVIA B., 1968, Research Associate in Microbiology; B.A., 1962, Syracuse; Ph.D., 1967, Pennsylvania

POLLAKOWSKI, HENRY O., 1972 (1973), Assistant Professor of Economics; A. B., 1966, Michigan; M.A., 1969, Ph.D., 1973, California (Berkeley)

POLLOCK, HELEN M., 1971, Instructor in Laboratory Medicine and Microbiology; Director, Microbiology Laboratory, Harborview Medical Center; B.A., 1960, Wisconsin; M.S., 1968, Ph.D., 1970, Ohio State

POLONIS, DOUGLAS H.,\* 1955 (1962), Professor of Metallurgical Engineering; Chairman, Department of Mining, Metallurgical, and Ceramic Engineering; Head, Division of Metallurgical Engineering; B.A.Sc., 1951, British Columbla; M.A.Sc., 1953, Toronto; Ph.D., 1955, British Columbia

POPE, CHARLES E. II, 1964 (1970), Associate Professor of Medicine; M.D., 1957, Western Reserve

POPE, EMILY N.,\* 1972, Assistant Professor of Linguistics; A.B., 1968, Radcliffe; Ph.D., 1972, Massachusetts Institute of Technology

PORTE, DANIEL, JR., 1963 (1973), Professor of Medicine; A.B., 1953, Brown; M.D., 1957, Chicago

PORTER, ALAN H., 1972 (1973), Research Associate in Social Management of Technology; B.S., 1967, California Institute of Technology; M.A., 1968, Ph.D., 1972, California (Los Angeles)

PORTER, STEPHEN C.,\* 1962 (1971), Professor of Geological Sciences; B.S., 1955, M.S., 1958, Ph.D., 1962, Yale

PORTER, W. THOMAS,\* 1966 (1971), Professor of Accounting; B.S., 1954, Rutgers; M.B.A., 1959, Washington; Ph.D., 1964, Columbia

PORTMAN, JOEL N., 1970, Lecturer in Microbiology; B.S., 1969, M.S., 1970, Washington

POST, ROBERT,\* 1960 (1968), Associate Professor of Speech; A.B., 1956, West Virginia Wesleyan; M.A., 1958, Ph.D., 1960, Ohio

POTTER, KARL H.,\* 1970 (1971), Professor of Philosophy and South Asian Studies; Associate Director, South Asian Program; Adjunct Professor of Asian Languages and Literature; B.A., 1950, California (Berkeley); M.A., 1952, Ph.D., 1955, Harvard

POTTER, WILLIAM W., 1970, Lecturer in Electrical Engineering; B.S., 1949, United States Naval Academy; M.S. in E.E., 1959, United States Naval Postgraduate School, Monterey

POULSEN, SUSAN B., 1970, Instructor in Psychosocial Nursing; B.S., 1962, Washington; M.S., 1970, Maryland

POWELL, G. LYNN, 1972, Instructor in Restorative Dentistry; D:D.S., 1968, Washington

POWERS, FRANCIS FOUNTAIN, 1928 (1972), Professor Emeritus of Education; B.A., 1923,



Washington; M.A., 1927, Oregon; Ph.D., 1928, Washington

PRACZUKOWSKI, EDWARD L.,\* 1965 (1967), Assistant Professor of Art; B.S., 1958, Tufts; M.F.A., 1965, Cranbrook Academy of Art, Michigan

PRASANNA, SUBBARAYAN, 1973, Lecturer in Urban Planning; B.Sc., 1957, Madras (India); B.Arch., 1962, Indian Institute of Technology; M.U.P., 1969, Washington

PRATER, GEORGE I.,\* 1966 (1968), Associate Professor of Accounting; B.A., 1955, Washington State; M.B.A., 1959, Ph.D., 1963, Stanford

PRATHER, ELIZABETH M.,\* 1965 (1970), Associate Professor of Speech; B.S., 1952, Nebraska; M.A., 1957, Ph.D., 1960, Iowa

PREDMORE, MICHAEL P.,\* 1965 (1969), Associate Professor of Spanish Language and Literature; B.A., 1959, Swarthmore; M.A., 1961, Ph.D., 1964, Wisconsin

PRESSLY, THOMAS J.,\* 1949 (1960), Professor of History; A.B., 1940, A.M., 1941, Ph.D., 1950, Harvard

PRESTON, CAROLINE E., 1949 (1972), Associate Professor of Psychiatry and Behavioral Sciences; B.A., 1940, M.A., 1941, Colorado

PRESTON, SAMUEL H.,\* 1972, Associate Professor of Sociology; B.A., 1965, Amherst; Ph.D., 1968, Princeton

PRESTON, THOMAS A., 1972, Associate Professor of Medicine; B.S., 1955, Swarthmore; M.D., 1962, Pennsylvania

PRIBBLE, ALLAN H., 1969 (1973), Instructor in Medicine; M.D., 1965, Washington (St. Louis)

PRICE, JOHN R.,\* 1969 (1972), Professor of Law; A.B., 1958, Florida; LL.B., 1961, New York University

PRINS, DAVID, 1969 (1973), Professor of Speech; B.A., 1952, Central (Iowa); M.A., 1957, Ph.D., 1961, Michigan

PROCTOR, RICHARD,\* 1962 (1970), Associate Professor of Art; B.A., 1958, M.A., 1962, Michigan State

PROSSER, HARVEY W., 1971, Professor and Chairman of Aerospace Studies; B.S., 1950, United States Military Academy; M.A., 1957, Columbia

PROSTERMAN, ROY L.,\* 1965 (1970), Professor of Law; A.B., 1954, Chicago; LL.B., 1958, Harvard

PROTHERO, JOHN W.,\* 1965 (1970), Associate Professor of Biological Structure; B.Sc., 1956, Ph.D., 1960, Western Ontario

PUFF, ROBERT DAVIS,\* 1962 (1967), Associate Professor of Physics; B.S., 1954, Washington (St. Louis); Ph.D., 1960, Harvard

PUNDT, HERMANN G.,\* 1968 (1973), Professor of Architecture; B.A., M.A., 1960, Illinois; Ph.D., 1969, Harvard

PURDY, BONNIE JEAN,\* 1964 (1970), Associate Professor of Physical Education; A.B., 1949, Colorado State; M.S., 1956, Washington (St. Louis); Ph.D., 1964, Southern California

PYKE, RONALD,\* 1960 (1966), Professor of Mathematics; B.A., 1953, McMaster; M.S., 1955, Ph.D., 1956, Washington

PYLE, KENNETH B.,\* 1965 (1969), Associate Professor of History and East Asian Studies; A.B., 1958, Harvard; Ph.D., 1965, Johns Hopkins Q

QUADRACCI, LEONARD J., 1969 (1971), Assistant Professor of Medicine; B.S., 1961, M.D., 1965, Marquette

QUIMBY, GEORGE 1.,\* 1965, Professor of Anthropology; Director, Burke Memorial-Washington State Museum; B.A., 1936, M.A., 1937, Michigan

#### R

RABINOVITCH, B. SEYMOUR,\* 1948 (1957), Professor of Chemistry; B.S., 1939, Ph.D., 1942, McGill

RABINOWITZ, ALAN,\* 1972; Associate Professor of Urban Planning; A.B., 1948, Yale; M.B.A., 1950, Harvard; Ph.D., 1969, Massachusetts Institute of Technology

RABURA, HORST M.,\* 1963 (1966), Assistant Professor of Germanic Languages and Literature; B.A., 1960, Seattle University; M.A., 1966, Washington

RADCLIFFE, DONALD, 1947 (1962), Associate Professor of Architecture; B.S. in C.E., 1932, M.S. in C.E., 1934, Illinois

RADER, MELVIN M., 1930 (1972), Professor Emeritus of Philosophy; A.B., 1925, M.A., 1927, Ph.D., 1929, Washington

RADKE, HUBERT F.,\* 1963 (1966), Assistant Professor of Surgery; M.D., 1954, Texas

RADKE, LAWRENCE F., 1968 (1973), Research Associate Professor of Atmospheric Sciences; B.S., 1964, M.S., 1966, Ph.D., 1968, Washington

RAE, WILLIAM HOWARD, JR.,\* 1956 (1967), Associate Professor of Aeronautics and Astronautics; Associate Director, Kirsten Wind Tunnel; B.S. in A.E., 1953, M.S. in A.E., 1959, Washington

RAGOZIN, DAVID L.,\* 1969, Assistant Professor of Mathematics; B.A., 1962, Reed; A.M., 1963, Ph.D., 1967, Harvard

RAHM, CARL MICHAEL,\* 1970 (1971), Assistant Professor of Economics; B.A., 1964, New York; Ph.D., 1971, Columbia

RAHSKOPF, HORACE G., 1928 (1944), Professor Emeritus of Speech; A.B., 1920, Willamette; M.A., 1927, Ph.D., 1935, Iowa

RAISYS, VIDMANTAS A., 1971 (1973), Assistant Professor of Laboratory Medicine; Director, Chemistry Laboratory, Harborview Medical Center; B.S., 1962, Rossevelt; M.S., 1965, Illinois; Ph.D., 1969, State University of New York

RAJAGOPAL, RANGASWAMY, 1973, Research Assistant Professor of Forest Resources and Quantitative Science; B.S., 1964, Bombay (India); M.E., 1969, Florida; Ph.D., 1973, Michican

RAMANATHAN, KAVASSERI V.,\* 1971, Associate Professor of Accounting; B.Com., 1954, Calcutta (India); M.B.A., 1962, Ph.D., 1970, Northwestern

RAO, POTLURI M., 1969, Assistant Professor of Economics; B.A., 1960, Andhra University (India); M.A., 1963, Delhi School of Economics (India); Ph.D., 1969, Chicago

RASKIND, MURRAY, 1973, Instructor in Psychiatry and Behavioral Sciences; B.A., 1964, Brown; M.D., 1968, Columbia

RATTRAY, MAURICE,\* 1950 (1962), Professor and Chairman of Oceanography; B.S., 1944, M.S., 1947, Ph.D., 1951, California Institute of Technology

RAVEN, PETER M.,\* 1965 (1969), Associate Professor of Art; B.A., 1953, M.A., 1959, Long Beach State

RAY, C. GEORGE,<sup>\*</sup> 1966 (1973), Professor of Laboratory Medicine, Pediatrics, and Microbiology; Head, Division of Microbiology; A.B., 1956, Augustana; M.D., 1960, Chicago

RAY, DIXIE LEE,\* 1945 (1957), Associate Professor of Zoology; on leave; B.A., 1937, M.A., 1938, Mills; Ph.D., 1945, Stanford

RAYMOND, CHARLES F.,\* 1969 (1973), Associate Professor of Geophysics; A.B., 1961, California (Berkeley); Ph.D., 1969, California Institute of Technology

RAYNOR, ELIZABETH A., 1973, Instructor in Maternal and Child Nursing; B.S., 1969, Oregon; M.N., 1973, Washington

RAZEVSKA, DZIDRA E., 1961 (1967), Research Associate in Medicine; B.S., 1954, Los Angeles State

READ, KENNETH E.,\* 1957 (1964), Professor of Anthropology; B.A., 1939, M.A., 1945, Sydney; Ph.D., 1948, London

READ, WILLIAM MERRITT, 1927 (1945), Professor Emeritus of Classics; A.B., 1923, DePauw; M.A., 1924, Ph.D., 1927, Michigan

REDEKER, CHARLES C., 1964, Assistant Professor of Electrical Engineering; B.S. in M.E., 1963, M.S. in M.E., 1964, Washington

REED, RICHARD J.,\* 1954 (1963), Professor of Atmospheric Sciences; B.S., 1945, California Institute of Technology; Sc.D., 1949, Massachusetts Institute of Technology

REED, T. GERVAIS, 1952 (1973), Assistant Professor of Art History; B.A., 1949, Yale

REESE, JOAN M., 1972, Associate in Physiological Nursing; B.S., 1963, Washington

REEVES, GEORGE SPENCER, 1935 (1948), Associate Professor Emeritus of Physical Education; B.S., 1933, Oregon State; M.S., 1937, Oregon; M.P.H., 1951, California

REGIMBAL, THEODORE J., 1971, Instructor in Pediatrics; B.S., 1953, Gonzaga; M.D., 1957, St. Louis

REICHENBACH, DENNIS D., 1966 (1970), Associate Professor of Pathology; B.S., 1955, M.D., 1958, Washington

REID, JOHN M., 1968 (1973), Affiliate Associate Professor of Electrical Engineering; B.E.E., 1950, M.S., 1957, Minnesota; Ph.D., 1965, Pennsylvania

REINERT, OTTO,\* 1956 (1972), Professor of English and Comparative Literature; B.A., 1947, Lafayette; M.A., 1948, Ph.D., 1952, Yale

REITAN, HENRY M.,\* 1967 (1971), Professor of Education; B.A., 1943, Concordia; Ph.D., 1950, North Dakota

REITAN, RALPH M.,\* 1970, Professor of Neurological Surgery and Psychology; B.A., 1944, Central YMCA College, Chicago; Ph.D., 1950, Chicago

RENICK, JOBYANN,\* 1971 (1972), Assistant Professor of Physical Education; B.S., 1963, M.A., 1967, Ohio State; Ph.D., 1972, Southern California

RENSBERGER, JOHN M.,\* 1966 (1972), Associate Professor of Geological Sciences; Curator, Burke Memorial-Washington State Museum; B.A., 1955, Colorado; M.A., 1961, Ph.D., 1967, California (Berkeley) REQUA, KENNETH ALAN, 1970 (1972), Assistant Professor of English; A.B., 1960, M.A., 1965, Notre Dame; Ph.D., 1972, Indiana

RESHETAR, JOHN S., JR.,\* 1957 (1962), Professor of Political Science and Russian and East European Studies; B.A., 1945, Williams; M.A., 1946, Ph.D., 1950, Harvard

RESNICK, HERMAN,\* 1967, Associate Professor of Social Work; B.A., 1951, M.S.S., 1956, New York University; Ph.D., 1970, Bryn Mawr

REY, WILLIAM HENRY,\* 1950 (1959), Professor of Germanic Languages and Literature and Comparative Literature; Ph.D., 1937, Frankfurt am Main

REYNOLDS, DONALD K.,\* 1959 (1960), Professor of Electrical Engineering; B.A., 1941, M.A., 1942, Stanford; Ph.D., 1948, Harvard

REYNOLDS, VEDA, 1966, Lecturer in Music; U.G. 1st Prize, 1932, Brussels Conservatory; Diploma, 1942, Curtis Institute of Music

RHODE, JOHN G., 1968 (1972), Associate Professor of Accounting; B.S., 1962, M.S., 1966, Ph.D., 1969, Minnesota

RHODES, FRED H., JR., 1927 (1969), Professor Emeritus of Civil Engineering; B.S. in C.E., 1926, B.S. in M.E., 1926, C.E., 1935, Washington

RICE, WILLIAM H., 1972, Professor of Naval Science; B.A., 1951, Duke; M.A., 1971, George Washington

RICHARDS, FRANCIS A.,\* 1959 (1964), Professor of Oceanography; B.S., 1939, Illinois; M.S., 1942, Nevada; Ph.D., 1950, Washington

RICHARDSON, WILLIAM C.,\* 1971 (1973), Associate Professor and Chairman of Health Services; B.A., 1962, Trinity; M.B.A., 1964, Chicago; Ph.D., 1971, Chicago

RICHEY, EUGENE P.,\* 1954 (1969), Professor of Civil Engineering; B.S. in C.E., 1941, Alaska; M.S., 1947, M.S. in C.E., 1948, California Institute of Technology; Ph.D., 1955, Stanford

RICHMAN, ROBERT J.,\* 1961 (1966), Professor of Philosophy; A.M., 1950, Ph.D., 1953, Harvard

RICHMOND, VIRGINIA L., 1957 (1972), Research Assistant Professor of Medicine; B.S., 1949, Oklahoma State; M.S., 1954, Oklahoma; Ph.D., 1963, Washington

RICKETTS, HOWARD J., 1966 (1971), Associate Professor of Radiology; A.B., 1954, Oberlin; M.D., 1958, Harvard

RIDDIFORD, LYNN M.,\* 1973, Associate Professor of Zoology; A.B., 1958, Radcliffe; Ph.D., 1961, Cornell

RIDER, JON K., Assistant Professor of Naval Science; B.A., 1963, Washington

RIEDEL, RICHARD A.,\* 1949 (1971), Professor and Chairman of Orthodontics; D.D.S., 1945, Marquette; M.S.D., 1948, Northwestern

**RIEKE**, LUVERN V.,\* 1949 (1956), Professor of Law; B.S., 1948, LL.B., 1949, Washington; LL.M., 1953, Chicago; LL.D., 1959, Pacific Lutheran

RIEKERK, HANS, 1967, Research Assistant Professor of Forest Soils; Candidate, 1954, State Agricultural College, Wageningen; M.Sc., 1961, Auburn; Ph.D., 1967, Washington

RIESS, JOHN T., 1972, Research Associate in Health Services; A.B., 1962, William and Mary; M.C.P., 1969, Pennsylvania

RILEY, WALTER LEE, 1946 (1965), Associate Professor of Political Science; Associate Dean, College of Arts and Sciences; B.A., 1933, Adams State; M.A., 1935, Stanford; Ph.D., 1957, Washington RIPLEY, HERBERT S., 1949, Professor of Psychiatry and Behavioral Sciences; A.B., 1929, Michigan; M.D., 1933, Harvard

RIS, THOMAS F., 1968, Lecturer in Communications; B.A., 1958, Colorado; M.S., 1968, Ohio

RITCHIE, WILLIAM,<sup>\*</sup> 1966 (1969), Assistant Professor of Art; B.A., 1964, Central Washington State; M.A., 1966, San Jose State

RITTER, DAVID MOORE,\* 1944 (1959), Professor of Chemistry; B.S., 1933, Ph.D., 1937, Chicago

RIVENBURGH, VIOLA K., 1944 (1967), Assistant Professor Emeritus of English; A.B., 1919, Nebraska; M.A., 1926, Hawaii

ROBERTS, EVE,\* 1969 (1973), Associate Professor of Drama

ROBERTS, LYNNE, 1972 (1973), Assistant Professor of Sociology; B.A., 1964, Kansas; M.A., 1968, Ph.D., 1969, Stanford

ROBERTS, NORMAN HAILSTONE,\* 1966 (1968), Associate Professor of Mechanical Engineering; B.S., 1947, Ph.D., 1958, Washington

ROBERTSON, JAMES CAMPBELL HAY, 1945 (1969), Professor Emeritus of Forest Resources; B.S.F., 1927, Washington; M.S.F., 1933, California; D.F., 1947, Duke

ROBERTSON, R. PAUL, 1971 (1973), Assistant Professor of Medicine; B.A., 1960, San Diego State; M.D., 1964, Creighton

ROBERTSON, WILLIAM O., 1963 (1972), Professor of Pediatrics; Director, Medical Education; Director, Poison Control Center, Children's Orthopedic Hospital and Medical Center; B.A., 1946, M.D., 1949, Rochester

ROBINOVITCH, MURRAY R.,\* 1966 (1971), Associate Professor of Oral Biology; Assistant Chairman, Department of Oral Biology; B.S., 1959, D.D.S., 1961, Minnesota; Ph.D., 1966, Washington

ROBINSON, DWIGHT E.,\* 1950 (1956), Professor of Business History and Environment; B.A., 1936, Yale; M.A., 1938, Oxford; Ph.D., 1948, Columbia

ROBINSON, HALBERT B.,\* 1968, Professor of Psychology; Director, Developmental Psychology Laboratory; A.B., 1951, M.A., 1953, Ph.D., 1957, Stanford

ROBINSON, REX JULIAN, 1929 (1945), Professor Emeritus of Chemistry; B.A., 1925, DePauw; M.A., 1927, Ph.D., 1929, Wisconsin

ROBKIN, MAURICE A.,\* 1967 (1968), Associate Professor of Nuclear Engineering; B.S., 1953, California Institute of Technology; Ph.D., 1961, Massachusetts Institute of Technology

ROBSON, FARRAND C., 1970 (1971), Instructor in Restorative Dentistry; B.A., 1966, Pacific Lutheran; D.D.S., 1970, Detroit

ROBSON, LINDA, 1971 (1973), Instructor in Biological Structure; B.S., 1966, Pacific Lutheran; Ph.D., 1971, Washington

ROCKAFELLAR, RALPH TYRRELL,\* 1966 (1972), Professor of Mathematics; Adjunct Professor of Computer Science; A.B., 1957, Harvard; M.S., 1959, Marquette; Ph.D., 1963, Harvard

RODDIS, RICHARD S. L.,\* 1968, Professor of Law; Dean, School of Law; B.A.A., 1951, San Diego State; J.D., 1954, California (Berkeley)

ROFFMAN, ROGER A., 1972, Assistant Professor of Social Work; B.A., 1963, Boston University; M.S.W., 1965, Michigan

ROGERS, DONALD EUGENE, 1969, Research Assistant Professor of Fisheries; B.S., 1958, California State Polytechnic; M.S., 1961, Ph.D., 1967, Washington ROGERS, MILLARD,\* 1952 (1967), Associate Professor of Art History and South Asian Studies; Director, Center for Asian Arts; Adjunct Curator, Burke Memorial-Washington State Museum; B.F.A., 1937, Art Institute of Chicago; M.A., 1940, University of Chicago; M.F.A., 1940, Art Institute of Chicago; Ph.D., 1952, Chicago

ROGERS, WALTER E.,\* 1946 (1956), Professor of Electrical Engineering; B.S. in E.E., 1934, California; M.S. in E.E., 1948, Washington

ROHN, PETER H.,\* 1958 (1967), Associate Professor of Political Science; B.A., 1952, Vienna; M.A., 1953, Ph.D., 1958, Washington

ROHRER, JOHN,\* 1948 (1959), Associate Professor of Architecture; B.Arch., 1937, Washington

ROHWER, SIEVERT A., 1973, Assistant Professor of Zoology; Curator in Zoology, Burke Memorial-Washington State Museum; B.A., 1964, South Florida; M.A., 1970, Ph.D., 1971, Kansas

ROLFE, BARI, 1971 (1972), Lecturer in Drama

ROLLA, RICHARD R., 1964 (1972), Lecturer in Pedodontics; B.S., 1956, D.D.S., 1961, Washington

ROLLER, J. REID,\* 1970, Associate Professor of Communications; B.Sc., 1938, M.B.A., 1940, Ohio State

ROLLER, JULIUS A.,\* 1945 (1960), Professor of Accounting; B.B.A., 1934, Washington; M.A., 1960, Michigan

ROMAN, HERSCHEL L.,\* 1942 (1952), Professor and Chairman of Genetics, 1959; A.B., 1936, Ph.D., 1942, Missouri (Columbia)

ROMANOWSKI, JACEK I.,\* 1967, Assistant Professor of Geography and Russian and East European Studies; B.A., 1959, McGill; Ph.D., 1969, Washington

ROMBAUER, MARJORIE DICK,\* 1960 (1971), Professor of Law; B.A., 1958, J.D., 1960, Washington

ROOSEN-RUNGE, EDWARD C.,\* 1952 (1959), Professor of Biological Structure; M.D., 1936, Hamburg

ROSE, NORMAN JENISCH,\* 1966 (1968), Associate Professor of Chemistry; B.A., 1957, Knox; Ph.D., 1960, Illinois

ROSE, PATRICIA A.,\* 1952 (1967), Associate Professor and Chairman of Maternal and Child Nursing; Diploma, 1946, St. Joseph's Hospital School of Nursing, Tacoma; B.S., 1949, M.N., 1958, Washington

ROSE, RICHARD M.,\* 1966 (1972), Associate Professor of Psychology; A.B., 1960, Princeton; M.A., 1961, Ph.D., 1964, Pennsylvania

ROSENZWEIG, JAMES,<sup>\*</sup> 1956 (1963), Professor of Management; B.A., 1951, M.B.A., 1954, Washington; Ph.D., 1956, Illinois

ROSINBUM, RALPH RAMBO,\* 1948 (1963), Associate Professor of Music; B.A., 1947, M.A., 1948, Washington

ROSNER, ARNOLD S.,\* 1966 (1967), Associate Professor of Architecture; B.S. in C.E., 1947, Illinois Institute of Technology; M.S. in E.E., 1949, California Institute of Technology

ROSS, RUSSELL,\* 1962 (1971), Professor of Pathology; Associate Dean for Scientific Affairs; A.B., 1957, Cornell; D.D.S., 1955, Columbia; Ph.D., 1962, Washington

ROSS, W. DUNCAN,\* 1961 (1968), Professor of Drama

ROSSANO, AUGUST T., JR.,\* 1962 (1965), Professor of Air Resources Engineering in Civil Engineering; S.B., 1938, Massachusetts Institute of Technology; S.M., 1941, Sc.D., 1954, Harvard



ROSSE, CORNELIUS,\* 1967 (1970), Associate Professor of Biological Structure; B.Sc., 1961, M.B., Ch.B., 1964, Bristol

ROSSEL, SVEN HAKON, 1974, Associate Professor of Scandinavian Languages and Literature; Magister, 1968, Copenhagen

ROTH, CATHARINE PRINCE,\* 1972, Assistant Professor of Classics; A.B., 1967, Harvard; B.A., 1969, Cambridge; Ph.D., 1972, Harvard

ROTH, GUENTHER,\* 1970, Professor of Sociology; Ph.D., 1960, California (Berkeley)

ROTHBERG, JOSEPH E.,\* 1969, Associate Professor of Physics; B.A., 1956, Pennsylvania; M.A., 1958, Ph.D., 1963, Columbia

ROTHENBERG, MICHAEL B., 1967 (1972), Professor of Psychiatry and Behavioral Sciences and Pediatrics; A.B., 1948, Harvard; M.D., 1954, Western Reserve

ROTHSCHILD, JOEL, 1973, Research Assistant Professor of Pathology; A.B., 1948, Harvard; Ph.D., 1958, Columbia

ROVIN, SHELDON,\* 1973, Professor of Oral Diagnosis; Dean, School of Dentistry; B.S., 1953, D.D.S., 1957, M.S., 1960, Michigan

ROWELL, LORING B.,\* 1962 (1972), Professor of Physiology and Biophysics; Adjunct Professor of Medicine; B.S., 1953, Springfield; Ph.D., 1962, Minnesota

ROWNTREE, JENNIE I., 1925 (1956), Professor Emeritus of Home Economics; B.S., 1918, Wisconsin; M.S., 1925, Chicago; Ph.D., 1929, Iowa

RUBIN, CYRUS E., 1954 (1962), Professor of Medicine; A.B., 1943, Brooklyn; M.D., 1945, Harvard

RUCH, THEODORE C.,\* 1946, Professor of Physiology and Biophysics; B.A., 1927, Oregon; M.A., 1928, Stanford; B.A., 1930, B.Sc., Oxon, 1932; Ph.D., 1933, Yale

RUDD, THOMAS G., 1968 (1972), Assistant Professor of Medicine and Radiology; B.S., 1959, M.D., 1963, Michigan

RUEGG, DAVID SEYFORT,\* 1972, Professor of Buddhist Studies, and South Asian Studies; Cert. Études Supérieures, 1957, Sorbonne; D.Litt., 1969, University of Paris

RUFF, CORALEASE C., 1973, Instructor in Maternal and Child Nursing; Diploma, 1965, Freedmen's Nursing School; B.S., 1971, Maryland; M.N., 1973, Washington

RUMERY, RUTH E., 1955 (1967), Research Associate Professor of Biological Structure; B.S., 1943, New Hampshire; M.S., 1947, Ph.D., 1952, Rochester

RUSHMER, ROBERT F., 1947 (1967), Professor of Bioengineering; Head, Division of Bioengineering, School of Medicine; Director, Center for Bioengineering; B.S., 1935, Chicago; M.D., 1939, Rush Medical College, Chicago

RUSSELL, DAVID A.,\* 1967 (1970), Associate Professor of Aeronautics and Astronautics; B.Eng., 1956, Southern California; M.Sc., 1957, Ph.D., 1961, California Institute of Technology

RUSTAGI, KRISHNA P., 1973, Assistant Professor of Forest Resources; B.Sci., 1951, M.Sc., 1953, Agra University (India); M.F., 1971, Ph.D., 1973, Yale

RUVALCABA, ROGELIO H. A., 1965 (1971), Associate Professor of Pediatrics; Director, Endocrine Clinic, Rainier School; M.D., 1957, De La Universidad de Guadalajara

RYCKMAN, DAVID B.,\* 1969 (1972), Associate Professor of Education; B.A., 1959, Michigan State; A.M., 1961, Chicago; Ed.D., 1966, Illinois **S** `

SABO, JESSE J., JR.,\* 1969, Assistant Professor of Physics; B.S., 1964, Maryland; Ph.D., 1968, California (Berkeley)

SACKETT, GENE P.,\* 1970, Professor of Psychology; B.A., 1959, California (Riverside); M.A., 1961, Ph.D., 1963, Claremont

SAKUMA, DONALD K., 1963 (1971), Associate Professor of Landscape Architecture and Building Construction; B.S.L.A., 1957, M.L.A., 1959, Harvard

SALE, ROGER HILLER,\* 1962 (1969), Professor of English; B.A., 1953, Swarthmore; M.A., 1954, Ph.D., 1957, Cornell

SALINERO, FERNANDO GARCIA,\* 1965 (1969), Associate Professor of Spanish Language and Literature; Ph.D., 1963; Madrid (Spain)

SALO, ERNEST OLAVI,\* 1965 (1968), Professor of Fisheries; B.S., 1947, Ph.D., 1955, Washington

SALYER, RUFUS COLEMAN, JR.,\* 1953 (1969), Professor of Education; Director, Advisory Services; B.A., 1930, Seattle Pacific; M.A., 1931, Ph.D., 1955, Washington

SAMUELSON, MERRILL,\* 1962, Associate Professor of Communications; B.S., 1948, Oklahoma City; M.S., 1955, Oregon; Ph.D., 1960, Stanford

SAND, PATRICIA L.,\* 1963 (1973), Associate Professor of Rehabilitation Medicine; B.S., 1961, M.S., 1963, Ph.D., 1964, Washington

SANDERS, JAMES, 1968, Assistant Professor of Architecture; B.Arch., 1963, Washington; M.Arch., 1966, Columbia

SANDLER, LAURENCE M.,\* 1961 (1966), Professor of Genetics; B.S., 1952, Cornell; M.S., 1954, Ph.D., 1956, Missouri (Columbia)

SANDLER, RONALD B. H., 1969 (1973), Instructor in Orthopaedics; A.B., 1962, Grinnell; M.D., 1966, Iowa

SANDWITH, COLIN JOHN,\* 1966, Assistant Professor of Mechanical Engineering; B.S. in M.E., 1961, Washington; Ph.D., 1967, Oregon State

SAPORTA, SOL,\* 1960 (1964), Professor of Linguistics and Romance Languages and Literature; Chairman, Department of Linguistics; B.A., 1944, Brooklyn; M.A., 1952, Ph.D., 1955, Illinois

SARASON, IRWIN G.,\* 1956 (1965), Professor of Psychology; B.A., 1951, Rutgers; M.A., 1953, Iowa; Ph.D., 1955, Indiana

SARASON, LEONARD,\* 1965 (1966), Associate Professor of Mathematics; B.S., 1945, Yale; Mus.B., 1948, Mus.M., 1949, Yale; Ph.D., 1961, New York University

SARIAN, SUREN, 1973, Research Associate Professor of Ceramic Engineering; B.S. in Cer.E., 1956, Alfred; Ph.D., 1965, Cornell

SARKANEN, KYOSTI VILHO,\* 1961 (1965), Professor of Wood Chemistry and Chemical Engineering; B.Sc., 1947, Helsinki; M.Sc., 1952, Ph.D., 1956, New York

SASANOFF, ROBERT, 1963, Assistant Professor of Architecture; B.Arch., 1963, M.C.P., 1968, California (Berkeley)

SATA, LINDBERGH S., 1968, Associate Professor of Psychiatry and Behavioral Sciences; Executive Director, Harborview Community Mental Health Center; B.S., 1951, M.D., 1958, M.S., 1964, Utah

SATHER, NORMAN F.,\* 1962 (1974), Professor of Chemical Engineering; B.S., 1958, Illinois; Ph.D., 1962, Minnesota

SAUERLANDER, ANNEMARIE M., 1947 (1949), Associate Professor Emeritus of German Literature; B.A., 1928, M.A., 1930, Buffalo; Ph.D., 1936, Cornell

SAUM, LEWIS O.,\* 1965 (1968), Associate Professor of History; B.S., 1958, North Dakota State Teachers College; M.A., 1959, Missouri (Columbia)

SAUNDERS, DAVID R., 1965 (1971), Associate Professor of Medicine; A.B., 1953, Princeton; M.D., 1957, McGill

SAVELLE, MAX, 1947, Professor Emeritus of History; A.B., 1924, M.A., 1926, Ph.D., 1932, Columbia

SAWHILL, ROY B.,\* 1956 (1969); Professor of Civil Engineering; B.S. in C.E., 1950, Washington; M.E., 1952, California

SAWYER, THOMAS K., 1964 (1972), Assistant Professor of Medicine; B.S., 1958, Oklahoma; M.D., 1962, Vanderbilt

SAX, GILBERT,\* 1966, Professor of Education and Psychology; B.A., 1953, M.A., 1956, California (Los Angeles); Ph.D., 1958, Southern California

SAXBERG, BORJE O.,\* 1957 (1967), Professor of Management and Organizational Behavior; Chairman, Department of Management and Organization; B.Econ., 1950, Swedish University (Finland); B.S., 1952, Oregon State; M.S., 1953, Ph.D., 1958, Illinois

SAXON, M. JEAN, 1949 (1965), Assistant Professor of Comparative Nursing Care Systems; Ph.B., 1943, Wisconsin; M.N., 1946, Yale

SCHAEFFER, WALTER HOWARD,\* 1952 (1960), Professor of Forestry; B.S.F., 1936, Washington; M.S.F., 1937, Yale; Ph.D., 1952, Washington

SCHAFER, ELDON L., 1969, Associate Professor of Accounting; B.S., 1953, M.A., 1957, Ph.D., 1963, Nebraska

SCHALL, LAWRENCE D.,\* 1968 (1972), Associate Professor of Finance and Business Economics; A.B., 1962, California (Los Angeles); Ph.D., 1969, Chicago

SCHALLER, GILBERT SIMON, 1922 (1964), Professor Emeritus of Mechanical Engineering; B.S. in M.E., 1916, Illinois; M.B.A., 1925, Washington

SCHALLER, JANE, 1965 (1971), Associate Professor of Pediatrics; A.B., 1956, Hiram; M.D., 1960, Harvard

SCHEINGOLD, STUART A.,\* 1969 (1970), Associate Professor of Political Science; B.S., 1953, Ohio State; M.A., 1959, Ph.D., 1963, California (Berkeley)

SCHELL, WILLIAM RAYMOND, 1971, Research Associate Professor of Fisheries; B.S., 1954, Oregon State; M.S., 1956, Idaho; Ph.D., 1963, Washington

SCHER, ALLEN M.,\* 1950 (1962), Professor of Physiology and Biophysics; B.A., 1942, Ph.D., 1951, Yale

SCHERR, BARRY P.,\* 1970 (1973), Assistant Professor of Russian Language and Literature and Russian and East European Studies; A.B., 1966, Harvard; M.A., 1967, Ph.D., 1972, Chicago

SCHICK, MICHAEL,\* 1969 (1973), Associate Professor of Physics; B.A., B.S., 1961, Tufts; M.S., 1964, Ph.D., 1967, Stanford

SCHIFFMAN, HAROLD F.,\* 1967 (1973), Associate Professor of South Asian Languages and South Asian Studies; Adjunct Associate Professor of Linguistics and Anthropology; B.A., 1960, Antioch; M.A., 1966, Ph.D., 1969, Chicago SCHILL, WILLIAM J.,\* 1967, Associate Professor of Education; B.S., 1950, M.A., 1952, Minnesota; Ed.D., 1963, California (Los Angeles)

SCHILLER, HARVEY S., 1972, Assistant Professor of Laboratory Medicine and Obstetrics and Gynecology; B.S., 1963, Wisconsin; M.D., 1966, Washington

SCHLUGER, SAUL,\* 1958 (1968), Professor of Periodontics; Associate Dean, School of Dentistry; Director, Graduate Denial Education; Director, Dental Admissions; D.D.S., 1931, Louisville

SCHMER, GOTTFRIED, 1969 (1973), Associate Professor of Laboratory Medicine; Head, Division of Coagulation; M.D., 1956, Vienna

SCHMID, CALVIN FISHER, 1937 (1941), Professor Emeritus of Sociology; B.A., 1925, Washington; Ph.D., 1930, Pittsburgh

SCHMIDT, FRED HENRY,\* 1947 (1956), Professor of Physics; B.S.E., 1937, Michigan; M.A., 1940, Buffalo; Ph.D., 1945, California (Berkeley)

SCHMITT, DAVID R.,\* 1968, Associate Professor of Sociology; B.A., 1960, Miami; M.A., 1962, Ph.D., 1963, Washington (St. Louis)

SCHNEIDER, JERRY B.,\* 1968 (1971), Associate Professor of Urban Planning and Civil Engineering; Adjunct Associate Professor of Environmental Studies; B.S., 1955, South Dakota School of Mines and Technology; M.C.P., 1961, California (Berkeley); Ph.D., 1966, Pennsylvania

SCHNEIDER, RAYMOND C.,\* 1964, Associate Professor of Architecture; B.S., 1949, M.S., 1952, Kansas; Ed.D., 1955, Stanford

SCHOENKNECHT, FRITZ D., 1967 (1969), Assistant Professor of Laboratory Medicine and Microbiology; Director, Microbiology Laboratory, University Hospital; M.D., 1957, Free University (Berlin)

SCHOLANDER, PER F., 1971, Research Professor of Zoology; M.D., 1932, Ph.D., 1934, Oslo

SCHOLZ, FRIEDRICH-WILHELM,\* 1972, Assistant Professor of Mathematics; Vordiplom, 1965, Universitat Gottingen; Ph.D., 1971, California (Berkeley)

SCHOMAKER, VERNER,\* 1965, Professor of Chemistry; B.S., 1934, M.S., 1935, Nebraska; Ph.D., 1938, California Institute of Technology

SCHRAG, CLARENCE C.,\* 1967, Professor of Sociology; B.A., 1930, Washington State; M.A., 1944, Ph.D., 1950, Washington

SCHREUDER, GERARD F.,\* 1971, Associate Professor of Forest Resources and Fisheries; Director, Forest Resource Management Laboratories; B.S., 1958, M.S., 1960, Wageningen; M.S., 1967, North Carolina State; Ph.D., 1968, Yale

SCHRIEBER, ALBERT N.,\* 1948 (1956), Professor of Business Policy and Operations Systems; B.S., M.E., 1938, Illinois Institute of Technology; M.B.A., 1947, Harvard

SCHROEDER, MARGUERITE P., 1964 (1971), Lecturer in Home Economics; B.S., 1940, Iowa State; M.S., 1943, Minnesota

SCHUBERT, WOLFGANG MANFRED,\* 1947 (1958), Professor of Chemistry; B.S., 1941, Illinois; Ph.D., 1947, Minnesota

SCHUBIGER, GEROLD A., 1972, Assistant Professor of Zoology; Ph.D., 1967, Zurich

SCHULTZ, AMELIA L., 1961 (1973), Research Assistant Professor of Medicine; A.B., 1935, Brooklyn; Ph.D., 1943, Columbia; M.S.W., 1947, Washington

SCHUMAN, DAVID F.,\* 1970 (1971), Assistant Professor of Political Science; B.A., 1964, Tulsa; M.A., 1966, Ph.D., 1971, California (Berkeley) SCHURR, JOHN MICHAEL,<sup>\*</sup> 1966 (1972), Associate Professor of Chemistry; B.S., 1959, Yale; Ph.D., 1965, California (Berkeley)

SCHWARTZ, JUDITH P., 1972, Acting Assistant Professor of Sociology; B.A., 1967, M.A., 1968, Washington (St. Louis); M.Phil., 1970, Yale

SCHWARZ, M. ROY,\* 1963 (1968), Associate Professor of Biological Structure; Associate Dean, School of Medicine; B.A., 1959, Pacific Lutheran; M.D., 1963, Washington

SCHWEID, ABRAHAM I., 1966 (1972), Assistant Professor of Pathology; Director, Cytology Laboratory, Harborview Medical Center; A.B., 1950, M.D., 1953, Cornell

SCONTRINO, M. PETER, 1973, Research Assistant Professor of Psychology; B.A., 1967, Seattle University; M.A., 1968, Ph.D., 1971, Michigan State

SCOTT, C. RONALD, 1965 (1971), Associate Professor of Pediatrics; M.D., 1959, Washington

SCOTT, DAVID ROBERT M.,\* 1955 (1964), Professor of Silviculture; B.A., 1942, Virginia; M.F., 1947, Ph.D., 1950, Yale

SCOTT, ROBERT H.,\* 1961 (1967), Professor of Finance and Business Economics; A.B., 1949, M.A., 1950, Kansas; M.A., 1956, Ph.D., 1961, Harvard

SCOTT, WILLIAM D.,\* 1968 (1970), Associate Professor of Ceramic Engineering; B.S. in Cer.E., 1954, Illinois; M.S. in Cer.E., 1959, Ph.D., 1961, California (Berkeley)

SCOTT, WILLIAM G.,\* 1967, Professor of Management and Organization; A.B., 1950, DePaul; M.S.I.R., 1952, Chicago; D.B.A., 1957, Indiana

SCRIBNER, BELDING H., 1951 (1962), Professor of Medicine; A.B., 1941, California; M.D., 1945, Stanford; M.S., 1951, Minnesota

SCROGGS, CAROLYN L., 1972, Assistant Professor of Education; B.A., 1964, Reed; M.A., 1966, Columbia; Ph.D., 1972, Washington

SEABLOOM, ROBERT W.,\* 1954 (1961), Associate Professor of Civil Engineering; B.S. in C.E., 1950, M.S. in C.E., 1956, Washington

SEAWELL, DONCOSTA E. D.,\* 1972, Assistant Professor of Law; A.B., 1968, Norfolk State; J.D., 1971, Harvard

SEBESTA, SAM LEATON,\* 1963 (1970), Professor of Education; B.S., 1953, Kansas; M.A., 1960, Northwestern; Ed.D., 1963, Stanford

SECREST, THOMAS W., 1964, Lecturer in Civil Engineering and Business, Government, and Society; B.S. in Ch.E., 1943, M.S. in Ch.E., 1946, Washington; LL.B., 1951, Georgetown

SEGAL, ARLENE, 1970, Associate in Pediatrics; B.S., 1958, M.S., 1960, Georgia

SEGAL, JACK,<sup>\*</sup> 1960 (1970), Professor of Mathematics; B.S., 1955, M.S., 1957, Miami; Ph.D, 1960, Georgia

SEHMSDORF, HENNING K.,\* 1967 (1968), Assistant Professor of Scandinavian Languages and Literature and Comparative Literature; B.S., 1960, Rochester; M.A., 1964, Ph.D., 1968, Chicago

SEIFERT, THOMAS R.,\* 1971 (1973), Assistant Professor of Health Services; Acting Director, Graduate Program in Health Services Administration and Planning; B.A., 1956, Washington; M.P.H., 1971, California (Berkeley)

SELIGMANN, CLAUS,\* 1964 (1968), Associate Professor of Architecture; Diploma of Architecture, 1951, The Polytechnic, London SELINKER, LARRY,<sup>\*</sup> 1966, Assistant Professor of Linguistics; Adjunct Assistant Professor of Humanistic-Social Studies; Director, English for Foreign Students; B.A., 1959, Brandeis; M.A., 1960, American; Ph.D., 1966, Georgetown

SELIPSKY, HERBERT, 1972, Instructor in Periodontics; B.D.S., 1961, H.D.D., 1967, Witwaterstrand; M.S., 1973, Washington

SELLS, CLIFFORD J., 1970 (1972), Assistant Professor of Pediatrics; B.A., 1959, Pacific Lutheran; M.D., 1963, Washington; M.P.H., 1968, California

SERGEV, SERGIUS I., 1923 (1971), Professor Emeritus of Engineering Mechanics in Civil Engineering; B.S. in M.E., 1923, M.E., 1931, Washington

SERRUYS, PAUL L-M.,\* 1965 (1969), Professor of Chinese and East Asian Studies; B.A., 1930, College St. Armand; S.T.I., 1936, Foreign Missions Institute (Belgium); Ph.D., 1955, California (Berkeley)

SETTLES, IVAN L., 1970, Lecturer in Education; Associate Director, School and College Placement; B.S., 1949, M.Ed., 1953, D.Ed., 1967, Washington State

SEVERSON, JEFFREY A., 1972, Instructor in Oral Diagnosis; D.D.S., 1972, Washington

SEVIN, ELIZABETH G., 1972, Instructor in Surgery; A.B., 1964, Barnard; M.D., 1969, Temple

SEYFRIED, WARREN R.,\* 1956 (1966), Professor of Business, Government, and Society, and Urban Planning; B.S., 1943, Vanderbilt; M.B.A., 1954, D.B.A., 1956, Indiana

SEYMOUR, ALLYN HENRY,\* 1948 (1963), Professor of Fisheries; Director, Laboratory of Radiation Ecology; B.S., 1937, Ph.D., 1956, Washington

SHADEL, WILLARD F.,\* 1963, Professor of Communications; B.A., 1933, Andrews; M.A., 1935, Michigan

SHAPIRO, BENNETT M.,\* 1970, Associate Professor of Biochemistry; B.S., 1960, Dickinson; M.D., 1964, Jefferson

SHAPIRO, MICHAEL C.,\* 1970 (1973), Assistant Professor of South Asian Languages and South Asian Studies; Adjunct Assistant Professor of Linguistics; B.A., 1967, Queens; M.A., 1970, Chicago

SHARP, BENITA H., 1966 (1969), Assistant Professor of Physiological Nursing; B.S., 1960, Emory; M.N., 1966, Washington

SHARP, LAWRENCE J., 1962 (1973), Associate Professor of Community Dentistry; Special Assistant to the Dean; B.A., 1957, Gonzaga; M.A., 1959, Ph.D., 1964, Washington State

SHARPE, GRANT WILLIAM,\* 1967, Professor of Outdoor Recreation; B.S.F., M.F., 1951, Ph.D., 1955, Washington

SHATTUCK, WARREN L., 1935 (1973), Professor Emeritus of Law; B.A., 1934, LL.B., 1934, Washington; J.S.D., 1936, Yale

SHAW, CHENG-MEI,\* 1960 (1968), Associate Professor of Pathology; M.D., 1950, National Taiwan University

SHAW, MARION L., 1970 (1973), Research Assistant Professor of Medicine and Physiology and Biophysics; B.S., 1955, Colorado College; A.M., 1957, Radcliffe; Ph.D., 1965, Harvard

SHAW, SPENCER G.,\* 1970 (1971), Associate Professor of Librarianship; B.S., 1940, Hampton Institute; B.L.S., 1941, Wisconsin

SHEPARD, THOMAS H., 1955 (1968), Professor of Pediatrics; Head, Central Laboratory for Human Embryology; A.B., 1945, Amherst; M.D., 1948, Rochester

FACULTY INDEX



SHERIF, MEHMET A.,\* 1963 (1969), Associate Professor of Civil Engineering; Brevet, 1953, Allepo College (Syria); B.S., 1957, Robert College (Istanbul); M.S., 1961, Arizona State; M.A., 1962, Ph.D., 1964, Princeton

SHERMAN, JOHN C.,\* 1942 (1964), Professor of Geography; B.A., 1937, Michigan; M.A., 1943, Clark; Ph.D., 1947, Washington

SHERRARD, DONALD J., 1958 (1970), Assistant Professor of Medicine; B.A., 1956, Yale; M.D., 1960, Washington

SHERRER, ROBERT EUGENE,\* 1960, Associate Professor of Mechanical Engineering; B.S. in M.E., 1948, Kansas; M.S. in E.M., 1953, Ph.D., 1958, Wisconsin

SHERRIS, JOHN C.,\* 1959 (1970), Professor and Chairman of Microbiology; M.B., B.S., 1948, M.D., 1950, London

SHERWIN, ELSA W., 1962, Lecturer Emeritus in Germanic Literature; Abitur, 1926, Ph.D., 1933, Berlin

SHIGAYA, MABEL KYO, 1953 (1966), Lecturer in Home Economics; B.A., 1951, M.A., 1960, Washington

SHIH, VINCENT Y. C., 1945 (1956), Professor Emeritus of Chinese; B.A., 1925, Fukien Christian (China); M.A., 1930, Yenching; Ph.D., 1939, Southern California

SHILLER, HARVEY S., 1972, Assistant Professor of Laboratory Medicine and Obstetrics and Gynecology; Director, Steroid Section; B.S., 1963, Wisconsin; M.D., 1966, Washington (St. Louis)

SHINN, RICHARD D.,\* 1964 (1969), Associate Professor and Chairman of Urban Planning; B.Arch., 1960, Idaho; M.S.C.R.P., 1962, Southern California; Ph.D., 1969, Washington

SHIPLEY, GEORGE,\* 1967 (1968), Assistant Professor of Spanish Language and Literature; A.B., 1959, Dartmouth; M.A., 1962, Ph.D., 1968, Harvard

SHIPMAN, GEORGE ANDERSON,\* 1946, Professor Emeritus of Public Affairs and Political Science; B.A., 1925, M.A., 1926, Wesleyan; Ph.D., 1931, Cornell

SHORACK, GALEN RICHARD,\* 1965 (1972), Associate Professor of Mathematics; B.A., 1960, M.A., 1962, Oregon; Ph.D., 1965, Stanford

SHORT, JOHN M., 1964 (1968), Assistant Professor of Medicine; B.A., 1956, Occidental; M.D., 1960, California (Los Angeles)

SHRADER, DAVID;\* 1969 (1972), Associate Professor of Music; B.Mus., 1961, M.Mus.Educ., 1963, Iowa; D.M.A., 1970, Oregon

SHULMAN, ROBERT PHILIP,\* 1961 (1968), Associate Professor of English; B.A., 1952, Syracuse; M.A., 1954, Ph.D., 1959, Ohio State

SHURTLEFF, DAVID B., 1960 (1971), Professor of Pediatrics; Head, Division of Congenital Defects; Chief, Pediatric Services; M.D., 1955, Tufts

SIEGEL, IVENS A.,\* 1968 (1973), Professor of Oral Biology; Adjunct Professor of Pharmacology; B.S., 1953, Columbia; M.S., 1958, Kansas; Ph.D., 1962, Cincinnati

SIEGLER, FREDERICK A.,\* 1966, Associate Professor of Philosophy; B.A., 1955, M.A., 1964, Oxford; Ph.D., 1960, Stanford

SIEGMUND, WILLIAM I., 1969 (1973), Lecturer in English; B.A., 1959, M.A., 1961, Columbia

SIEKER, LARRY, 1971, Research Associate in Biological Structure; B.A., 1954, Pacific Lutheran SIENKIEWICZ, CHARLES G., 1970 (1971), Lecturer in Electrical Engineering; Engineer, Applied Physics Laboratory; B.S. in E.E., 1959, M.S. in E.E., 1961, Washington

SIGELMANN, RUBENS A.,\* 1959 (1968), Associate Professor of Electrical Engineering; B.S. in E.E., 1952, Universidade de S. Paulo; M.S. in E.E., 1961, Ph.D., 1963, Washington

SIKI, BELA,\* 1966, Professor of Music; Artist Teacher Degree, 1945, Academie of Franz Liszt (Budapest); Virtuosity With Distinction, 1948, Conservatoire (Geneva)

SIKKEMA, WESLEY W., 1970, Assistant Professor of Surgery; B.A., 1953, Hope; M.D., 1957, Michigan

SIKS, GERALDINE B.,\* 1950 (1965), Professor of Drama; B.A., 1935, Central Washington State; M.A., 1940, Northwestern

SILBERBERG, EUGENE,\* 1967 (1973), Associate Professor of Economics; B.S., 1960, City College of New York; Ph.D., 1964, Purdue

SIMKIN, PETER A., 1966 (1970), Assistant Professor of Medicine; B.A., 1957, Swarthmore; M.D., 1961, Pennsylvania

SIMONS, BERNARD C., 1964 (1970), Assistant Professor of Rehabilitation Medicine; Head, Department of Rehabilitation Medicine; Certificate of Completion, California

SIMONSON, HAROLD PETER,\* 1968, Professor of English; B.A., 1950, B.Ed., 1951, Puget Sound; M.A., 1951, Ph.D., 1958, Northwestern

SIMPSON, DAVID P.,\* 1965 (1970), Associate Professor of Medicine; A.B., 1952, Massachusetts; M.D., 1957, Montreal

SIMPSON, ROGER A., 1970 (1973), Assistant Professor of Communications; B.A., 1959, Washington; M.S., 1961, Wisconsin; Ph.D., 1973, Washington

SINGER, MICHAEL J., 1972, Research Associate in Forest Resources; B.S., 1966, Cornell; M.S., 1968, Ph.D., 1972, Minnesota

SIVERTZ, VICTORIAN, 1926 (1949), Associate Professor Emeritus of Chemistry; B.S., 1922, Washington; M.S., 1924, West Virginia; Ph.D., 1926, McGill

SKAHEN, JULIA G.,\* 1946 (1961), Associate Professor of Physiology and Biophysics and Biological Structure; B.S., 1926, M.S., 1928, Washington; Ph.D., 1940, Chicago

SKEELS, DELL R., 1949 (1963), Professor of Humanistic-Social Studies; B.A., 1941, M.A., 1942, Idaho; Ph.D., 1949, Washington

SKELLEY, GRANT,\* 1969, Assistant Professor of Librarianship; B.A., 1948, Portland; M.A., 1952, M.Libr., 1952, Washington; Ph.D., 1968, California (Berkeley)

SKINNER, JOAN,\* 1967, Associate Professor of Dance; B.A., 1946, Bennington; M.A., 1964, Illinois

SKIRVIN, W. JEAN, 1968 (1970), Assistant Professor of Architecture; B.Arch., 1960, Oregon; M.A., 1968, Washington

SKOWRONEK, FELIX,\* 1968 (1971), Associate Professor of Music; B.Mus., 1956, Curtis Institute of Music

SLABY, RONALD G.,\* 1970 (1971), Assistant Professor of Psychology; B.A., 1966, Ph.D., 1971, Wisconsin

SLEICHER, CHARLES A.,\* 1960 (1966), Professor of Chemical Engineering; B.Sc., 1944, Brown; M.S., 1949, Massachusetts Institute of Technology; Ph.D., 1955, Michigan SLICHTER, SHERRILL J., 1967 (1971), Assistant Professor of Medicine; B.A., 1959, Washington State; M.D., 1963, George Washington

SLOAN, PHILLIP R.,\* 1969 (1972), Assistant Professor of Biomedical History; B.S., 1960, Utah; M.S., 1964, M.A., 1967, Ph.D., 1969, California (San Diego)

SLUTSKY, LEON JUDAH,\* 1961 (1969), Professor of Chemistry; A.B., 1953, Cornell; Ph.D., 1957, Massachusetts Institute of Technology

SMALL, KENNETH H., 1967 (1974), Assistant Professor of Philosophy; Adjunct Assistant Professor of Linguistics; A.B., 1960, Harvard; M.A., 1961, Chicago

SMALL, ROBERT E.,\* 1965 (1966), Associate Professor of Architecture; B.Arch., 1952, Kansas; M.Arch., 1955, Oregon

SMATHERS, GARRETT A., 1970 (1973), Assistant Professor of Forest Resources; B.A., 1952, Furman; M.A., 1955, Western Carolina; Ph.D., 1972, Hawaii

SMITH, CECILIA M., 1972, Instructor in Comparative Nursing Care Systems; Diploma, 1955, St. Mary's Hospital, San Francisco; B.S., 1956, College of the Holy Names, Oakland; M.S., 1962, California (Berkeley)

SMITH, CHARLES,\* 1948 (1970), Professor of Art; B.A., 1955, Washington; M.F.A., 1956, Cranbrook Academy of Art, Michigan

SMITH, CHARLES KENT, 1971 (1972), Assistant Professor of Family Medicine; B.A., 1960, M.S., 1964, M.D., 1963, Northwestern

SMITH, CHARLES Z., 1973, Professor of Law; Associate Dean, School of Law; B.S., 1952, Temple; LL.B., 1955, Washington

SMITH, CURRAN J., 1973, Instructor in Otolaryngology; A.B., 1963, M.D., 1966, Missouri

SMITH, DALE E.,\* 1960 (1971), Associate Professor of Prosthodontics; D.D.S., 1952, Pittsburgh

SMITH, DAVID W., 1966 (1967), Professor of Pediatrics; Head, Division of Dysmorphology; A.B., 1946, California; M.D., 1950, Johns Hopkins

SMITH, ELIZABETH KNAPP, 1957 (1970), Research Associate Professor of Laboratory Medicine and Pediatrics; B.S., 1938, Florida State; M.S., 1939, Michigan; Ph.D., 1943, Iowa

SMITH, EUGENE HERBERT,\* 1960 (1966), Associate Professor of English; B.A., 1950, Oberlin; M.A., 1954, Ph.D., 1963, Washington

SMITH, FRANCIS W., JR.,\* 1968 (1973), Professor of Law; B.A., 1955, Virginia; LL.B., 1962, Richmond; LL.M., 1968, Harvard

SMITH, GARY,\* 1970 (1972), Assistant Professor of Pharmacy; Director, Drug Information Service; Pharm.D., 1966, California

SMITH, GEORGE SHERMAN, 1921 (1960), Professor Emeritus of Electrical Engineering; B.S. in E.E., 1916, E.E., 1924, Washington

SMITH, GERALD, 1973, Instructor in Radiology; M.D., 1966, Northwestern

SMITH, HARRIET H., 1949 (1962), Associate Professor Emeritus; B.A., 1918, Mount Holyoke; Diploma, 1920, Seattle General Hospital; M.N., 1957, Washington

SMITH, J. DUNGAN,\* 1966 (1971), Associate Professor of Oceanography and Geophysics; B.A., 1962, M.S., 1963, Brown; Ph.D., 1968, Chicago

SMITH, JAMES O.,\* 1971, Professor of Education; A.B., 1949, Baker; M.Ed., 1950, Southern Methodist; Ed.D., 1962, George Peabody College for Teachers
SMITH, JOHN P.,\* 1969 (1973), Associate Professor of Education; B.A., 1959, M.Ed., 1963, Missouri; Ed.D., 1969, Stanford

SMITH, LYNWOOD STEPHEN,\* 1965 (1973), Professor of Fisheries; B.S., 1952, M.S., 1955, Ph.D., 1962, Washington

SMITH, MONCRIEFF H., JR.,\* 1949 (1959), Professor of Psychology; Associate Director, Physiology-Psychology Program; A.B., 1940, M.A., 1941, Missouri; Ph.D., 1947, Stanford

SMITH, NATHAN J., 1965, Professor of Pediatrics; B.A., 1942, M.D., 1945, Wisconsin

SMITH, ORVILLE A.,\* 1958 (1967), Professor of Physiology and Biophysics; Director, Regional Primate Research Center; B.A., 1949, Arizona; M.A., 1950, Ph.D., 1953, Michigan State

SMITH, PHILLIP H., 1973, Research Associate in Medicine; B.S., 1967, M.Ed., 1969, Shippensburg State; Ph.D., Center of Pennsylvania State

SMITH, RICHARD D.,\* 1971, Assistant Professor of Librarianship; B.S., 1952, Pennsylvania State; M.A., 1964, Denver; Ph.D., 1970, Chicago

SMITH, RONALD E.,\* 1969 (1973), Associate Professor of Psychology; B.A., 1963, Marquette; M.A., 1965, Ph.D., 1968, Southern Illinois

SMITH, STEWART W.,\* 1970, Professor and Chairman of Geophysics; Adjunct Professor of Geological Sciences; S.B., 1954, Massachusetts Institute of Technology; M.S., 1958, Ph.D., 1961, California Institute of Technology

SMITH, WILLIAM OVERTON,\* 1966 (1969), Professor of Music; B.A., 1950, M.A., 1952, California (Berkeley)

SMOLL, FRANK LOUIS,\* 1970, Assistant Professor of Physical Education; B.A., 1963, Ripon; M.S., 1966, Ph.D., 1970, Wisconsin

SMUCKLER, EDWARD A.,\* 1961 (1969), Professor of Pathology; B.A., 1952, Dartmouth; M.D., 1956, Tufts; Ph.D., 1963, Washington

SMYTHE, ROBERT THOMAS,\* 1969 (1970), Assistant Professor of Mathematics; A.B., 1963, Oberlin; B.A., 1965, Oxford (England); Ph.D., 1969, Stanford

SNOW, JEFFREY M., 1969, Associate in Pediatrics; B.A., 1964, Knox; M.A., 1967, Montana

SNYDER, B. CHARLENE, 1971, Research Instructor in Maternal and Child Nursing; Diploma, 1963, Baptist Memorial Hospital School of Nursing, Oklahoma; B.S.N., 1964, M.N., 1971, Washington

SNYDER, JACK MC LEAN, 1969 (1972), Assistant Professor of Otolaryngology; B.A., 1953, M.A., 1956, Michigan; Ph.D., 1971, Washington

SNYDER, RICHARD C.,\* 1949 (1963), Professor of Zoology; Adjunct Curator of Herpetology, Burke Memorial Washington State Museum; A.B., 1940, A.M., 1941, Ph.D., 1948, Cornell

SOBOLWESKI, JOHN S., 1973, Research Assistant Professor of Medicine and Computer Sciences; B.E., 1962, M.E., 1966, Adelaide; Ph.D., 1970, Washington State

SOKOL, VILEM MARK,\* 1948 (1965), Professor of Music; Mus.B., 1938, Oberlin Conservatory; Grad. Cert., 1939, Conservatory of Music (Prague)

SOLBERG, CARL E.,\* 1968 (1971), Associate Professor of History; B.A., 1962, Minnesota; M.A., 1963, Ph.D., 1967, Stanford

SOLBERG, RAMONA,\* 1967 (1968), Associate Professor of Art; B.A., 1951, M.F.A., 1957, Washington

SOLTERO, DONALD J., 1972, Instructor in Oral Diagnosis; B.S., 1968, Seattle University; D.D.S., 1972, Washington SOMMERS, EARL E., 1972, Instructor in Oral Diagnosis; B.S., 1967, Ball State; D.D.S., 1971, Indiana

SOPER, MARY ELLEN,\* 1972, Assistant Professor of Librarianship; B.A., 1955, M.S., 1963, Ph.D., 1972, Illinois (Urbana)

SORBY, DONALD L.,\* 1972, Professor of Pharmacy; Chairman, Department of Pharmacy Practice; B.S., 1958, Nebraska; M.S., 1959, Ph.D., 1960, Washington

SOUTH, MARIE-LUISE S.,\* 1968 (1971), Assistant Professor of Germanic Languages and Literature; B.A., 1962, Texas; M.A., 1964, California (Berkeley)

SOUTHER, JAMES W., 1948 (1969), Professor of Humanistic-Social Studies; Director, Placement Center; B.A., 1947, M.A., 1948, Washington

SPADONI, LEON R., 1963 (1969), Associate Professor of Obstetrics and Gynecology; B.S., 1953, M.D., 1957, Washington

SPAFFORD, MICHAEL,<sup>\*</sup> 1963 (1972), Associate Professor of Art; B.A., 1959, Pomona; M.A., 1960, Harvard

SPAIN, DAVID H.,\* 1968 (1969), Assistant Professor of Anthropology and African Studies; B.A., 1961, M.A., 1962, Ohio State; Ph.D., 1969, Northwestern

SPARKMAN, DONAL R., 1949 (1966), Associate Professor of Medicine; Director, Heart, Cancer, Stroke Regional Medical Programs; B.S., 1930, Washington; M.D., 1934, Pennsylvania

SPARKS, DAVID W., 1973, Acting Assistant Professor of Speech; B.A., 1969, M.A., 1970, Massachusetts

SPENCE, HOMER E.,\* 1967, Assistant Professor of Marketing; B.S., 1963, M.B.A., 1965, Ph.D., 1967, Ohio State

SPERRY, ROBERT,\* 1954 (1965), Professor of Art; B.A., 1950, Saskatchewan; B.F.A., 1954, Art Institute of Chicago; M.F.A., 1955, Washington

SPITZNAGLE, LARRY A.,\* 1968, Assistant Professor of Bionucleonics; B.S., 1965, M.S., 1966, Ph.D., 1969, Purdue

SPRATLEN, THADDEUS H.,\* 1972, Associate Professor of Marketing; B.S., 1956, M.A., 1957, Ph.D., 1962, Ohio State

SPROULE, JOHN,\* 1948 (1960), Associate Professor of Architecture; B.Arch., 1934, Washington

SPYRIDAKIS, DIMITRIS E., 1970 (1973), Research Assistant Professor of Civil Engineering; B.S., 1957, Athens Graduate School of Agriculture; M.S., 1959, Ph.D., 1965, Wisconsin

SREEBNY, LEO M.,\* 1957 (1961), Professor of Oral Biology and Pathology; Chairman, Department of Oral Biology; Director, Center for Research in Oral Biology; A.B., 1942, D.D.S., 1945, M.S., 1950, Ph.D., 1954, Illinois

SRINIVASAN, M., 1972, Research Associate in Metallurgical Engineering; B.Sc., 1964, Madras; B.E., 1967, Indian Institute of Science; M.S., 1969, Ph.D., 1972, Washington

STABER, DANIEL E., JR., Captain, United States Army, 1971, Assistant Professor of Milltary Science; B.A., 1965, Seattle University

STACKMAN, JEANNE F., 1972, Instructor in Maternal and Child Nursing; Diploma, 1948, St. Joseph's School of Nursing, San Francisco; B.S.N., 1971, M.N., 1972, Washington

STADLER, DAVID R.,\* 1956 (1967), Professor of Genetics; B.A., 1948, Missouri; M.A., 1950, Ph.D., 1952, Princeton STAHL, WILLIAM L., 1967 (1971), Associate Professor of Medicine and Physiology and Biophysics; B.S., 1958, Noire Dame; Ph.D., 1963, Pittsburgh

STALEY, JAMES T.,\* 1972, Assistant Professor of Microbiology; A.B., 1960, Minnesota; M.Sc., 1963, Ohio State; Ph.D., 1967, California (Davis)

STAMATOYANNOPOULOS, GEORGE, 1965 (1973), Research Professor of Medicine; M.D., 1960, Greece

STAMM, KEITH R., 1973, Associate Professor of Communications; B.S., 1963, M.S., 1965, Ph.D., 1968, Wisconsin

STAMMEL, JOHN R., 1972, Instructor in Anesthesiology; M.B.B.S., 1964, Sydney (Australia); F.F.A.R.C., 1970, Adelaide (Australia)

STANDAERT, THOMAS A., 1972, Research Instructor in Pediatrics; B.A., 1964, Montclair State; Ph.D., 1970, Duke

STANDEVEN, MURIEL V., 1965 (1970), Assistant Professor of Family and Community Nursing; B.S., 1949, Washington; M.A., 1961, Columbia

STANTON, ROBERT BRUCE,\* 1956 (1967), Associate Professor of English; B.A., 1949, M.A., 1950, Kansas City; Ph.D., 1953, Indiana

STANTON-HICKS, MICHAEL, 1972, Assistant Professor of Anesthesiology; M.B., B.S., 1961, Adelaide (Australia); F.F.A.R.C.S., 1968, Royal College of Surgeons (London)

STARK, RODNEY,\* 1971 (1972), Professor of Sociology; B.A., 1950, Denver; M.A., 1965, Ph.D., 1971, California (Berkeley)

STAUB, CHRISTIAN, 1967 (1969), Assistant Professor of Architecture; Certificate of Photography, 1944, Kunstgewerbeschule, Zurich

STAUFFER, MARTHA E., 1967 (1972), Assistant Professor of Pathology and Laboratory Medicine; A.B., 1956, Vassar; M.D., 1960, Maryland

STEBBINS, THOMAS A.,\* 1965, Assistant Professor of Biological Structure; Director, Medical Illustrations; B.A., 1942, Amherst

STEELE, CLAUDE M., 1973, Assistant Professor of Psychology; B.A., 1967, Hiram; M.A., 1969, Ph.D., 1971, Ohio State

STEENE, BIRGITTA K.,\* 1973, Professor and Chairman of Scandinavian Languages and Literature; B.A., 1951, Upsala; M.A., 1956, Ph.D., 1960, Washington; Fil. lic., 1965, Upsala

STEINBRUECK, VICTOR,\* 1946 (1969), Professor of Architecture; B.Arch., 1935, Washington

STENZEL, GEORGE,\* 1949 (1962), Professor of Forest Engineering; B.S., 1938, New Hampshire; M.F., 1939, Yale

STEPHENSON, STEPHEN J.,\* 1969 (1972), Assistant Professor of Speech; A.B., 1962, San Francisco State; M.S., 1964, Illinois; Ph.D., 1972, Michigan

STERN, EDWARD ABRAHAM,\* 1966, Professor of Physics; B.S., 1951, Ph.D., 1955, California Institute of Technology

STERN, IRVING B.,\* 1959 (1968), Professor of Periodontics; B.S., 1941, City College of New York; D.D.S., 1946, New York; Certificate, 1956, Columbia

STERNBERG, RICHARD W.,\* 1967, (1970), Associate Professor of Oceanography; Adjunct Associate Professor of Environmental Studies; B.A., 1958, California (Los Angeles); M.S., 1961, Ph.D., 1965, Washington

STETTLER, REINHARD F.,\* 1963 (1968), Associate Professor of Forest Genetics; Adjunct



Associate Professor' of Genetics; Diploma, Forsting, 1955, Federal Institute of Technology (Zurich); Ph.D., 1963, California (Berkeley)

STEVENS, CHARLES F.,\* 1963 (1972), Professor of Physiology and Biophysics; B.A., 1956, Harvard; M.D., 1960, Yale; Ph.D., 1964, Rockefeller Institute

STEVENS, JOSEPH H., JR.,\* 1971, Assistant Professor of Education; B.A., 1965, Chicago; Ph.D., 1969, George Peabody College for Teachers

STEVENSON, JOHN K.,\* 1954 (1972), Professor of Surgery; M.D., 1949, Rochester

STEVICK, ROBERT DAVID,\* 1962 (1969), Professor and Chairman of English; B.A., 1949, M.A., 1951, Tulsa; Ph.D., 1956, Wisconsin

STEWART, DOUGLAS, 1971 (1972), Instructor in Medicine; B.S., 1961, California Institute of Technology; M.D., 1965, Harvard

STEWART, JOHN R.,\* 1969, Assistant Professor of Speech; B.A., 1963, Pacific Lutheran; M.A., 1964, Northwestern; Ph.D., 1969, Southern California

STEWART, RICHARD J.,\* 1969, Assistant Professor of Geological Sciences; B.A., 1965, Minnesota; Ph.D., 1970, Stanford

STIBBS, GERALD D.,\* 1948 (1970), Professor of Restorative Dentistry; B.S., D.M.D., 1931, Oregon

STIEFEL, DORIS J., 1972, Assistant Professor of Oral Biology; B.S., 1951, D.D.S., 1954, M.S., 1971, Washington

STIER, FLORENCE R.,\* 1964 (1970), Professor of Social Work; B.A., 1939, Chatham; M.S.S.A., 1941, Pittsburgh; D.S.W., 1973, Columbia

STIRLING, CHARLES E.,\* 1968 (1973), Associate Professor of Physiology and Biophysics; A.B., 1961, George Washington; Ph.D., 1966, State University of New York

STIRLING, T. BRENTS, 1932 (1949), Professor Emeritus of English; LL.B., 1926, Ph.D., 1934, Washington

STOBER, QUENTIN JEROME, 1968 (1972), Research Associate Professor of Fisheries; B.S., 1960, M.S., 1962, Ph.D., 1968, Montana State

STOEBE, THOMAS G.,\* 1966 (1969), Associate Professor of Metallurgical Engineering; B.S. in Mtl.Sc., 1961, M.S. in Mtl.Sc., 1963, Ph.D. (Mtl.Sc.), 1965, Stanford

STOEBUCK, WILLIAM B.,\* 1967 (1970), Professor of Law; B.A., 1951, Wichita State; M.A., 1953, Indiana; J.D., 1959, Washington; S.J.D., 1973, Harvard

STOLOV, WALTER C.,\* 1960 (1970), Professor of Rehabilitation Medicine; B.S., 1948, City College, New York; M.A., 1951, M.D., 1956, Minnesota

STONE, CAROL LARSON, 1967, Lecturer in Home Economics; B.A., 1943, Eastern Washington State; B.S., 1944, Washington; M.A., 1948, Washington State

STORB, RAINER, 1965 (1973), Associate Professor of Medicine; Physikum, 1957, Munchen; State Med. Exam., 1960; M.D., 1960, Freiburg/Br.

STORB, URSULA B.,\* 1968 (1970), Assistant Professor of Microbiology; Physikum, 1957, M.D., 1960, Tubingen

STORCH, LAILA,\* 1968 (1971), Associate Professor of Music; B.A., 1964, Wilkes

STOTLAND, EZRA,\* 1957 (1965), Professor of Psychology; Director, Program in Society and Justice; B.S., 1948, City College, New York; M.A., 1949, Ph.D., 1953, Michigan

STOTSKY, BERNARD, 1973, Professor of Psychiatry and Behavioral Sciences; B.S., 1948, City University of New York; M.A., 1949, Ph.D., 1951, Michigan; M.D., 1962, Western Reserve

STOUT, EDGAR LEE,\* 1969, Associate Professor of Mathematics; B.A., 1960, Oregon State; M.A., 1961, Ph.D., 1964, Wisconsin

STOUT, GEORGE HUBERT,\* 1957 (1969), Professor of Chemistry; A.B., 1953, M.S., 1954, Ph.D., 1956, Harvard

STRAND, HARVEY A., 1967 (1972), Assistant Professor of Restorative Dentistry; D.D.S., 1957, Washington

STRANDJORD, PAUL E., 1969, Professor and Chairman of Laboratory Medicine; B.A., 1951, M.A., 1952, Minnesota; M.D., 1959, Stanford

STRANDNESS, D. EUGENE, JR.,\* 1962 (1970), Professor of Surgery; B.A., 1950, Pacific Lutheran; M.D., 1954, Washington

STRATHMANN, RICHARD R., 1973, Assistant, Professor of Zoology; Resident Associate Director, Friday Harbor Laboratories; B.A., 1963, Pomona; M.S., 1966, Ph.D., 1970, Washington

STRAUSSER, HOWARD S., JR.,\* 1955 (1957), Associate Professor of Civil Engineering; B.S. in C.E., 1942, Virginia Military Institute; M.S.E., 1950, Johns Hopkins

STRAYER, GEORGE DRAYTON, JR.,\* 1949, Professor of Education; B.S., 1927, Princeton; M.A., 1928, Ph.D., 1934, Columbia

STREATFIELD, DAVID C., 1971, Assistant Professor of Landscape Architecture; Diploma of Architecture, 1956, Diploma of Landscape Architecture, 1962, London; M.L.A., 1966, Pennsylvania

STREET, ROBERT ELLIOTT,\* 1948 (1955), Professor of Aeronautics and Astronautics; B.S. in Physics, 1933, Rensselaer Polytechnic Institute; A.M., 1934, Ph.D., 1939, Harvard

STREETER, DANIEL D., JR., 1971, Research Associate in Pathology; S.B., 1946, S.M., 1951, Massachusetts Institute of Technology; Ph.D., 1969, Catholic University of America

STREIB, JOHN FREDERICK, JR.,\* 1947 (1960), Associate Professor of Physics; B.S., 1936, Ph.D., 1942, California Institute of Technology

STREISSGUTH, ANN P., 1964 (1968), Assistant Professor of Psychiatry and Behavioral Sciences; B.S., 1954, Oregon State; M.A., 1957, California (Berkeley); Ph.D., 1964, Washington

STREISSGUTH, DANIEL,\* 1955 (1969), Professor of Architecture; B.Arch., 1948, Washington; M.Arch., 1949, Massachusetts Institute of Technology

STREITBERGER, WILLIAM R., 1973, Assistant Professor of English; B.A., 1969, Kansas; M.A., 1971, Ph.D., 1973, Illinois

STRESHINSKY, NAOMI G.,\* 1970 (1971), Associate Professor of Social Work; B.A., 1944, Hunter; M.S.W., 1949, D.S.W., 1970, California (Berkeley)

STRIKER, GARY E.,\* 1966 (1971), Associate Professor of Pathology; Assistant Dean of Curriculum, School of Medicine; M.D., 1959, Washington

STROMBERG, DON D., 1970 (1972), Assistant Professor of Anesthesiology and Physiology and Biophysics; B.A., 1961, California; M.D., 1966, Ph.D., 1971, Washington

STRONG, DENNIS F.,\* 1967 (1969), Associate Professor of Business History and Environment; B.A., 1951, Yale; Ph.D., 1959, Washington STROTHER, CHARLES R.,\* 1947, Professor of Psychology and Psychiatry and Behavioral Sciences; Adjunct Professor of Education; B.A., 1929, M.A., 1932, Washington; Ph.D., 1935, Iowa

STROTHERS, GORDON, 1971 (1973), Assistant Professor of Otolaryngology; M.B., B.S., 1964, Middlesex Hospital Medical School; F.R.C.S., Middlesex Hospital, London

STUART, BRUCE O., 1968, Lecturer in Radiology; B.A., 1956, M.S., 1959, Wooster, Rochester

STUART, KATHLEEN H., 1973, Assistant Professor of Home Economics; B.S., 1957, Radford; M.S., 1959, Minnesota; Ed.D., 1973, Washington State

STUIVER, MINZE,\* 1969, Professor of Geological Sciences and Zoology; M.S., 1953, Ph.D., 1958, Groningen (The Netherlands)

STUNTZ, DANIEL E.,\* 1940 (1958), Professor of Botany; B.S., 1935, Washington; Ph.D., 1940, Yale

STURDIVANT, EDWARD C., 1973, Assistant Professor of Periodontics; D.D.S., 1969, Tennessee

SUDERBURG, ROBERT CHARLES,\* 1966 (1970), Professor of Music; B.A., 1957, Minnesota; M.Mus., 1960, Yale; Ph.D., 1966, Pennsylvania

SUE, STANLEY,\* 1971, Assistant Professor of Psychology; B.S., 1966, Oregon; M.A., 1967, Ph.D., 1971, California (Los Angeles)

SUGAR, PETER F.,\* 1959 (1969), Professor of History; Associate Director, Russian and East European Studies, Institute for Comparative and Foreign Area Studies; B.A., 1954, City College, New York; M.A., 1956, Ph.D., 1959, Princeton

SUH, DOO SOO,\* 1955 (1970), Associate Professor of Korean and East Asian Studies; M.A., 1930, Keojo Imperial University; M.A., 1950, Ph.D., 1953, Columbia

SULLIVAN, JOHN BRENDAN,<sup>\*</sup> 1973, Assistant Professor of Mathematics; A.B., 1966, Harvard; Ph.D., 1971, Cornell

SULLIVAN, KAREN D., 1973, Instructor in Maternal and Child Nursing; B.S.N., 1964, Washington; M.S., 1973, Delaware

SULLIVAN, KENT N., 1968 (1970), Assistant Professor of Medicine; M.D., 1960, Indiana

SULLIVAN, WOODRUFF T. III,\* 1973, Assistant Professor of Astronomy; B.S., 1966, Massachusetts Institute of Technology; Ph.D., 1971, Maryland

SULZBACHER, STEPHEN I., 1966 (1972), Assistant Professor of Pediatrics; B.S., 1962, Pennsylvania State; M.A., 1964, Hollins; Ph.D., 1971, Washington

SUMI, MARK,\* 1966 (1971), Associate Professor of Medicine and Pathology; M.D., 1956, Toronto

SUMMER, CHARLES E.,\* 1969, Professor of Business Policy, Administrative Theory, and Organizational Behavior; B.A., 1947, William and Mary; M.B.A., 1948, Pennsylvania; Ph.D., 1957, Columbia

SUMNER, DAVID S., 1970 (1972), Associate Professor of Surgery; A.B., 1954, North Carolina; M.D., 1958, Johns Hopkins

SUNDEM, GARY R., 1971, Assistant Professor of Accounting; B.A., 1967, Carleton; M.B.A., 1969, Ph.D., 1971, Stanford

SUNDSTEN, JOHN W.,\* 1962 (1970), Associate Professor of Biological Structure; A.B., 1956, Ph.D., 1961, California (Los Angeles) SUTERMEISTER, ROBERT A.,\* 1949 (1952), Professor of Personnel and Organizational Behavior; A.B., 1934, Harvard; M.A., 1942, Washington

SUTTON, DWIGHT, 1969 (1971), Associate Professor of Otolaryngology; Research Affiliate, Regional Primate Research Center; Principal Investigator, Institute for Laryngeal Research, Virginia Mason Research Center; B.S., 1951, M.S., 1951, M.S., 1955, Idaho; Ph.D., 1962, California (Berkeley)

SWANSON, AUGUST G., 1958 (1970), Professor of Medicine; Associate Dean, School of Medicine; A.B., 1945, Missouri; M.D., 1949, Massachusetts

SWANSON, PHILLIP D., 1964 (1968), Professor of Medicine; B.S., 1954, Yale; M.D., 1958, Johns Hopkins

SWARM, H. MYRON,\* 1947 (1959), Professor of Electrical Engineering and Geophysics; Assoclate Dean, College of Engineering; Director, Office of Engineering Research; B.S. in E.E., 1940, M.S. in E.E., 1950, Washington; Ph.D., 1960, Stanford

SWAYZE, E. HAROLD, \* 1963 (1969), Associate Professor of Russian Language and Literature and Russian and East European Studies; B.A., 1952, Reed; M.A., 1954, Ph.D., 1959, Harvard

SWINDLER, DARIS R.,\* 1968, Professor of Anthropology; Adjunct Curator, Burke Memorial Washington State Museum; A.B., 1950, West Virginia; M.A., 1952, Ph.D., 1959, Pennsylvania

SWOOPE, CHARLES C., JR,\* 1967 (1973), Professor of Prosthodontics; D.D.S., 1959, Maryland; M.S.D., 1964, Washington

SYDOW, JOHN D.,\* 1970 (1971), Professor of Drama; B.S., 1947, Illinois; M.F.A., 1950, Yale

SYLVESTER, ROBERT O.,\* 1947 (1957), Professor of Civil Engineering and Environmental Studies; Director, Institute for Environmental Studies; B.S. in C.E., 1936, Washington; S.M., 1941, Harvard

SZABO, LA VERNE L., 1970, Instructor in Laboratory Medicine; B.Ed., 1942, Chicago Teacher's College; M.S., 1970, Washington.

SZEFTEL, MARC, 1961, Professor Emeritus of History; Matur, 1919, Stan. Stazic Gymnasium (Poland); Magister of Laws, 1925, Warsaw; Docteur en droit, 1934, Lic.Slav.Phil.Hist., 1939, Universite Libre de Bruxelles

SZOLLOSI, DANIEL,\* 1962 (1968), Associate Professor of Biological Structure; A.B., 1956, Santa Clara; M.S., 1958, Ph.D., 1961, Wisconsin

### Т

TABEI, TORU, 1971, Research Assistant Professor of Obstetrics and Gynecology; B.S., 1957, M.D., 1961, Chiba, Japan

TABER, RICHARD DOUGLAS,\* 1968, Professor of Forest Zoology; A.B., 1942, California (Berkeley); M.S., 1949, Wisconsin; Ph.D., 1951, California

TAFT, BRUCE, 1973, Research Associate Professor of Oceanography; B.S., 1951, Stanford; M.S., 1961, Ph.D., 1965, California (San Diego)

TAGGART, RAYMOND,\* 1962 (1968), Professor of Mechanical Engineering; B.S., 1948, London; Ph.D., 1956, Queens (Belfast)

TAKAGI, CALVIN Y.,\* 1961 (1969), Professor of Social Work; Associate Dean, School of Social Work; B.A., 1950, M.S.W., 1952, Ph.D., 1958, Minnesota TAKAYA, TED T.,\* 1967 (1969), Assistant Professor of Japanese and East Asian Studies; B.A., 1951, Reed; M.A., 1961, Ph.D., 1969, Columbia

TALLEY, WILLIAM E., JR., 1971, Lecturer in Landscape Architecture; B.S.L.A., 1959, Rhode Island School of Design

TAMARIN, ARNOLD,\* 1962 (1971), Professor of Oral Biology; B.S., 1949, D.D.S., 1951, Illinois; M.S.D., 1961, Washington

TÁMERIUS, RITA K., 1972, Instructor in Maternal and Child Nursing; B.S.N., 1968, M.N., 1972, Washington

TAMURA, HIROKUNI,\* (1967), Associate Professor of Quantitative Methods; B.S., 1957, Waseda; B.S., 1960, M.S., 1961, Ph.D., 1967, Michigan

TAUB, FRIEDA BLOU,\* 1962 (1972), Professor of Fisheries; B.A., 1955, M.S., 1957, Ph.D., 1959, Rutgers

TAYLOR, E. AYERS, 1929 (1952), Professor Emeritus of English; B.A., 1909, Denver; M.A., 1918, Ph.D., 1925, Chicago

TAYLOR, EUGENE MARK, 1972, Research Assistant Professor of Rehabilitation Medicine; B.S., 1958, Idaho State; M.S., 1959, Ph.D., 1964, Washington

TAYLOR, GEORGE EDWARD,\* 1939 (1940), Professor of East Aslan Studies, Institute for Comparative and Foreign Area Studies; A.B., 1927, A.M., 1928, D.Litt., 1957, Birmingham (England)

TAYLOR, MURIAL K., 1968 (1970), Assistant Professor of Psychiatry and Behavioral Sciences; A.B., 1958, M.D., 1962, Cornell

TAYLOR, NORMAN,\* 1968 (1970), Assistant Professor of Art; B.F.A., 1964, Washington State; M.A., M.F.A., 1967, University of Iowa

TAYLOR, ROBERT L., 1941 (1969), Professor Emeritus of Law; B.A., 1927, Yale; J.D., 1930, Northwestern

TEACHOUT, PETER R.,\* 1970, Assistant Professor of Law and Society; B.A., 1962, Amherst; J.D., 1965, Harvard; M.A., 1967, Sussex, England

TEATHER, EDWARD C.,\* 1967 (1971), Associate Professor of Social Work; B.A., 1959, B.S.W., 1960, M.S.W., 1961, British Columbia

TEEL, W. STEPHEN, 1969, Assistant Professor of Restorative Dentistry; B.S., 1949, Seattle Pacific; D.D.S., 1954, Washington

TELLER, DAVID C.,\* 1965 (1969), Associate Professor of Biochemistry; B.A., 1960, Swarthmore; Ph.D., 1964, California (Berkeley)

TELLER, DAVIDA Y.,\* 1965 (1971), Associate Professor of Psychology and Physiology and Biophysics; B.A., 1960, Swarthmore; Ph.D., 1965, California (Berkeley)

TEMPLETON, FREDERIC E., 1946 (1968), Professor of Radiology; B.S., 1927, Washington; M.D., 1931, Oregon

TENCKHOFF, HENRICH, 1964 (1972), Associate Professor of Medicine; M.D., 1955, Köln

TERREL, RONALD LEE,\* 1967 (1970), Associate Professor of Civil Engineering; B.S. in C.E., 1960, M.S. in C.E., 1961, Purdue; Ph.D., 1967, California (Berkeley)

TERRELL, MARGARET E., 1928 (1971), Professor Emeritus of Home Economics; A.B., 1923, Penn (Iowa); M.A., 1927, Chicago

TERRY, MIRIAM,\* 1930 (1950), Associate Professor of Music; B.M., 1926, M.A., 1948, Washington THALBERG, STANTON PHILIP,\* 1965 (1970), Associate Professor of Education; B.A., 1957, M.A., 1959, Ph.D., 1964, Iowa

THIEL, PHILIP,\* 1961 (1966), Professor of Architecture; B.S., 1943, Webb Institute of Naval Architecture; M.S., 1948, Michigan; B.Arch., 1952, Massachusetts Institute of Technology

THOMAS, CAROL G.,\* 1964 (1971), Associate Professor of History; A.B., 1960, Carleton; A.M., 1961, Ph.D., 1964, Northwestern

THOMAS, DAVID PHILLIP,\* 1950 (1966), Professor of Wood Science and Technology; Associate Dean, College of Forest Resources; B.S.F., 1941, M.F., 1948, Washington

THOMAS, E. DONNALL, 1963, Professor of Medicine; M.D., 1946, Harvard

THOMAS, GOMER C., 1969, Assistant Professor of Mathematics; B.A., 1962, Pomona; B.A., 1964, Trinity College, Cambridge (England); Ph.D., 1968, Illinois

THOMAS, MORGAN D.,\* 1959 (1966), Professor of Geography; Associate Dean, Graduate School; B.A., 1951, Ph.D., 1954, Queen's (Belfast)

THOMAS, ROBERT P.,\* 1963 (1969), Associate Professor of Economics; Adjunct Associate Professor of Environmental Studies; A.B., 1960, Carleton; Ph.D., 1965, Northwestern

THOMAS, STEPHEN N.,\* 1969, Assistant Professor of Philosophy; A.B., 1964, Harvard; Ph.D., 1968, Massachusetts Institute of Technology

THOMAS, TERRY M., 1972 (1973), Instructor in Hospital Dentistry; D.D.S., 1971, Loyola

THOMPSON, ARTHUR R., 1971 (1973), Assistant Professor of Medicine; B.A., 1961, Amherst; M.D., 1966, Ph.D., 1972, Washington

THOMPSON, DONOVAN J.,\* 1970, Professor and Chairman of Biostatistics; B.A., 1941, St. Olaf; M.A., 1947, Minnesota; Ph.D., 1951, Iowa State

THOMPSON, GARY,\* 1966 (1972), Associate Professor of Speech; B.A., 1953, M.A., 1955, State University of Iowa; Ph.D., 1966, Minnesota.

THORNE, RICHARD EUGENE, 1970, Senior Research Associate in Fisheries; B.S., 1965, M.S., 1968, Ph.D., 1970, Washington

THORNTON, JUDITH A.,\* 1961 (1972), Professor of Economics and Russian and East European Studies; B.A., 1956, Vassar; M.A., 1958, Ph.D., 1960, Radcliffe

THRASHER, ALLEN W., 1973, Assistant Professor of Sanskrit and South Asian Studies; A.B., 1967, Ph.D., 1972, Harvard

TIFFANY, WILLIAM R.,\* 1947 (1964), Professor of Speech; B.A., 1946, M.A., 1947, Washington; Ph.D., 1951, Iowa

TIPPIT, DORIS F., 1960, Research Associate in Pediatrics; B.S., 1944, Utah

TITANI, KOITI, 1969, Research Associate Professor of Biochemistry; B.S., 1955, M.S., 1957, Ph.D., 1960, Tokyo

TOLAS, ANDREW G., 1965 (1969), Clinical Assistant in Oral Surgery; D.D.S., 1958, Illinois

TOOLSON, L. BRIAN, 1970 (1971), Instructor in Prosthodontics; D.D.S., 1967, Washington

TOPPING, JOHN W., 1972, Assistant Professor of Oral Surgery: B.S., 1956, Fairfield; D.D.S., 1960, Iowa; M.S., 1972, New York

TORKELSON, GERALD MELVIN,\* 1965, Professor of Education; B.S., 1941, Central State College, Wisconsin; Ph.M., 1945, Wisconsin; Ed.D., 1953, Pennsylvania State



TORNEY, JOHN ALFRED, JR., 1930 (1948), Associate Professor Emeritus of Physical Education; B.S., 1938, Washington; M.S., 1930, Columbia

TORRENCE, GERARD R., 1954 (1961), Associate Professor of Building Construction; B.S. in C.E., 1949, Washington; M.S. in C.E., 1950, Massachusetts Institute of Technology

TOSTBERG, ROBERT EUGENE,\* 1962 (1965), Associate Professor of Education; B.A., 1956, Oregon; M.A., 1958, Ph.D., 1960, Wisconsin

TOWE, ARNOLD L.,\* 1953 (1965), Professor of Physiology and Biophysics; B.A., 1948, Pacific Lutheran; Ph.D., 1953, Washington

TOWNES, BRENDA D., 1961 (1972), Assistant Professor of Psychiatry and Behavioral Sciences; A.B., 1957, Antioch; M.A., 1958, Mills; Ph.D., 1970, Washington

TOWNSEND, JAMES R.,\* 1968, Associate Professor of Political Science and East Asian Studies; Associate Director, China and Inner Asia Program, Institute for Comparative and Foreign Area Studies; B.A., 1953, Omaha; M.A., 1957, Ph.D., 1965, California (Berkeley)

TRAGER, WILLIAM F.,\* 1972, Associate Professor of Pharmaceutical Chemistry; B.S., 1960, California (San Francisco); Ph.D., 1965, Washington

TRAUTMAN, PHILIP A.,\* 1956 (1961), Professor of Law; B.A., 1952, J.D., 1954, Washington

TREADGOLD, DONALD W.,\* 1949 (1959), Professor of History and Russian and East European Studies; Chairman, Department of History; B.A., 1943, Oregon; M.A., 1947, Harvard; D.Phil., 1950, Oxford

TREMANN, JAMES A., 1972 (1973), Assistant Professor of Urology; B.A., 1962, B.S., M.D., 1966, Minnesota

TRIMBLE, LOUIS P., 1956 (1967), Associate Professor of Humanistic-Social Studies; on leave; B.A., 1950, Ed.M., 1953, Eastern Washington

TROSPER, RONALD L., 1973, Acting Assistant Professor of Economics and Public Affairs; A.B., 1967, A.M., 1970, Harvard

TROTTER, MARTHA JANE, 1963 (1970), Assistant Professor of Rehabilitation Medicine; B.A., 1957, East Tennessee State; Physical Therapy Certificate, 1964, Duke

TROUPIN, ROSALIND H., 1968 (1973), Associate Professor of Radiology; B.S., 1956, City College, New York; M.D., 1960, Columbia

TROY, CHARLES,\* 1965 (1972), Assistant Professor of Music; B.A., 1958, Washington; M.A., 1961, Ph.D., 1972, Harvard

TRUELOVE, EDMOND L., 1972, Assistant Professor and Chairman of Oral Diagnosis; B.S., 1964, D.D.S., 1967, M.S.D., 1971, Indiana

TRUITT, J. FREDERICK,\* 1969 (1972), Associate Professor of International Business; A.B., 1963, Muhlenberg; M.B.A., 1965, D.B.A., 1969, Indiana

TRUMAN, JAMES W.,\* 1973, Assistant Professor of Zoology; B.S., 1967, Notre Dame; M.A., 1969, Ph.D., 1970, Harvard

TSCHUDIN, MARY S., 1942 (1969), Professor and Dean Emeritus of Nursing; B.S., 1935, Certificate in Public Health Nursing, 1936, M.S.N., 1939, Washington

TSOI, MANG SO, 1966 (1972), Research Associate in Medicine; B.S., 1961, Whitworth; M.S., 1963, Ph.D., 1966, Washington

TSUKADA, MATSUO,\* 1969 (1972), Professor of Botany, B.A., 1953, Shinshu; M.Sc., 1958, D.Sc., 1961, Osaka TSUTAKAWA, GEORGE,\* 1946 (1963), Professor of Art; B.A., 1937, M.F.A., 1950, Washington

TUFTS, PAUL DEWITT, 1958 (1967), Associate Professor of Music; B.A., 1949, M.A., 1951, Washington

TUNKS, LEHAN K.,\* 1963, Professor of Law; A.B., 1935, Nebraska; J.D., 1938, Northwestern; J.S.D., 1947, Yale

TURCK, MARVIN, 1964 (1971), Professor of Medicine; B.S., 1955, M.D., 1959, Illinois

TURNBULL, KENNETH JAMES,\* 1958 (1966), Associate Professor of Forest Biometry; Director, International Forest Resources Laboratories; B.Sc., 1951, Edinburgh; M.F., 1958, Ph.D., 1963, Washington

TURNER, MABEL A., 1941 (1968), Associate Professor Emeritus of Librarianship; A.B., 1926, Oregon; B.S.L.S., 1931, M.S.L.S., 1959, Columbia

TYLER, NANCY B., 1970 (1973), Assistant Professor of Rehabilitation Medicine; B.S., 1964, Puget Sound; M.O.T., 1971, Washington

#### U

UEHLING, EDWIN ALBRECHT, 1936 (1947), Professor Emeritus of Physics; B.A., 1925, Wisconsin; M.A., 1930, Ph.D., 1932, Michigan

UELAND, KENT, 1963 (1969), Associate Professor of Obstetrics and Gynecology; B.A., 1953, Carleton; B.S., M.D., 1957, Illinois

UGOLINI, FIORENZO CESARE,\* 1966 (1973), Professor of Forest Soils; Dipl., 1948, Lyceum; B.S., 1957, Ph.D., 1960, Rutgers

ULLMAN, EDWARD L.,\* 1951, Professor of Geography; S.B., 1934, Chicago; A.M., 1935, Harvard; Ph.D., 1942, Chicago

ULLMAN, JOAN CONNELLY,\* 1966 (1968), Associate Professor of History; B.A., 1951, California; M.A., 1953, Ph.D., 1963, Bryn Mawr

UNTERMANN, RICHARD K., 1971, Assistant Professor of Landscape Architecture; B.L.A., 1963, M.L.A., 1966, Harvard

UNTERSTEINER, NORBERT,\* 1957 (1967), Professor of Atmospheric Sciences and Geophysics; AIDJEX Coordinator, Division of Marine Resources; Ph.D., 1950, Innsbruck; Dozent, 1961, Vienna

#### V

VAGNERS, JURIS,\* 1967 (1973), Associate Professor of Aeronautics and Astronautics; B.S.A.E., 1961, Washington; M.S.A.A., 1963, Ph.D., 1967, Stanford

VALENTINETTI, AURORA,\* 1961 (1973), Associate Professor of Drama; B.A., 1943, M.A., 1949, Washington

VAN ARSDEL, PAUL P., JR., 1953 (1969), Professor of Medicine; B.S., 1948, Yale; M.D., 1951, Columbia

VANCE, JOSEPH A.,\* 1957 (1968), Associate Professor of Geological Sciences; B.S., 1951, Ph.D., 1957, Washington

VAN CITTERS, ROBERT L.,\* 1962 (1970), Professor of Physiology and Biophysics and Medicine; Dean, School of Medicine; A.B., 1949, M.D., 1953, Kansas

VAN CLEVE, RICHARD,\* 1948 (1971), Professor of Fisheries; B.S., 1927, Ph.D., 1936, Washington VANDEMAN, JACQUELINE L.,\* 1967, Associate Professor of Maternal and Child Nursing; B.S., 1946, Colorado; M.N., 1951, Washington; Ph.D., 1967, Pittsburgh

VAN DEN BERGHE, PIERRE,\* 1965 (1967), Professor of Sociology and African Studies; B.A., 1953, M.A., 1953, Stanford; M.A., 1959, Ph.D., 1960, Harvard

VANDENBOSCH, ROBERT,\* 1963 (1967), Professor of Chemistry; A.B., 1954, Calvin; Ph.D., 1957, California (Berkeley)

VAN DER MARCK, JAN,\* 1972, Associate Professor of Art History; Curator, Henry Art Gallery; B.A., 1952, M.F.A., 1954, Ph.D., 1956, Nijmegen

VANDERVEER, BEVERLY, 1967 (1969), Associate in Pediatrics; B.A., 1958, Mills; M.S., 1960, Ph.D., Washington

VANDUSEN, KAREN ANN, 1971, Instructor in Environmental Health; B.S., 1965, Washington

VAN HASSEL, HENRY J., 1967 (1972), Associate Professor of Physiology and Biophysics and Endodontics; B.A., 1954, Maryville; D.D.S., 1963, Maryland; M.S.D., 1967, Washington

VAN NESS, ALLAN L., 1973, Assistant Professor of Orthodontics; D.D.S., 1966, Cert., 1972, Washington

VAREY, GORDON B.,\* 1962 (1973), Professor of Architecture and Building Construction; Chairman, Department of Architecture; B.Arch., 1954, Washington; M.Arch., 1966, California (Berkeley)

VARGAS-BARON, ANIBAL,\* 1949 (1974), Associate Professor Emeritus of Spanish Language and Literature and Latin American Studies; B.A., 1926, Asbury; M.A., 1929, Ph.D., 1943, Washington

VASARHELYI, DESI D.,\* 1949 (1961), Professor of Civil Engineering; B.A., 1928, Ref. Collegium Kolozsvar (Rumania); Dipl. Ingr., 1932, Dr. Ingr., 1944, Technical University (Budapest)

VAUGHAN, MICEAL FRANCIS, 1973, Assistant Professor of English; B.A., 1968, St. Thomas; M.A., 1972, Ph.D., 1973, Cornell

VELIKONJA, JOSEPH,\* 1964, Associate Professor of Geography and Russian and East European Studies; Undgr., 1944, Ljubljana (Yugoslavia); Ph.D., 1948, Rome

VERESS, SANDOR A.,\* 1963 (1972), Professor of Civil Engineering; B.S. in Forest Engineering, 1951, Jozef Nador Technical and Economical University of Hungary (Budapest); M.S., 1956, Hungarian Technical University of Sopron; Ph.D., 1968, Universitè de Laval (Quebec)

VERRALL, JOHN WEEDON, 1948 (1959), Professor Emeritus of Music; B.Mus., 1929, Minneapolis College of Music; Cert. of Mus., 1932, Liszt Conservatory (Budapest); B.A., 1934, Minnesota

VESPER, KARL HAMPTON,\* 1969, Associate Professor of Management and Organization and Mechanical Engineering; B.S., 1955, Stanford; M.B.A., 1960, Harvard; M.S., Ph.D., 1966, Stanford

VIGNOLI, LOUIS J.,\* 1966 (1968), Assistant Professor of Classics; B.A., 1962, St. Mary's (California); M.A., 1965, Ph.D., 1968, Starford

VILCHES, OSCAR E.,\* 1968 (1973), Associate Professor of Physics; Licenciado en Fisica, 1959, Instituto de Física "Dr. J. A. Balseiro"; Doctor en Física, 1966, Universidad Nacional de Cuyo (Argentina)

VINCENZI, FRANK F.,\* 1967 (1972), Associate Professor of Pharmacology and Pharmacy; B.S., 1960, M.S., 1962, Ph.D., 1965, Washington VLASES, GEORGE C., 1969 (1974), Professor . of Nuclear Engineering; B.E.S., 1958, Johns Hopkins; M.S., 1959, Ph.D., 1962, California Institute of Technology

VOLWILER, WADE, 1949 (1959), Professor of Medicine; A.B., 1939, Oberlin; M.D., 1943, Harvard

VONTVER, LOUIS A., 1969 (1971), Assistant Professor of Obstetrics and Gynecology; B.A., 1956, B.S., M.D., 1960, Minnesota; M.Ed. 1970, Washington

VOYLES, JOSEPH B.,\* 1965 (1969), Associate Professor of Germanic Languages and Literature; Adjunct Professor of Linguistics; B.A., 1960, M.A., 1962, Ph.D., 1965, Indiana

VRACKO, RUDOLF,\* 1962, Associate Professor of Pathology; Chief, Laboratory Medicine, Veterans Administration Hospital; M.D., 1955, Munich

## **'W**

WAALAND, J. ROBERT,\* 1969, Assistant Professor of Botany; B.A., 1966, Ph.D., 1969, California (Berkeley)

WADDEN, DOUGLAS, 1970 (1972), Assistant Professor of Art; B.F.A., 1968, Rochester; M.F.A., 1970, Yale

WADE, ROGER D., 1951 (1967), Lecturer in Biochemistry; B.A., 1949, Central Washington

WADLAND, JEAN D., 1973, Research Associate in Health Services (MEDEX); B.S., 1965, Bowling Green; M.P.A., 1972, Washington

WAGAR, JOHN ALAN,\* 1967 (1972), Professor of Outdoor Recreation; Adjunct Professor of Environmental Studies; B.S.F., 1952, Washington; M.F., 1956, Ph.D., 1961, Michigan

WAGER, L. WESLEY,\* 1954 (1973), Professor of Sociology; B.A., 1949, M.A., 1952, Washington; Ph.D., 1959, Chicago

WAGGENER, THOMAS RUNYAN,\* 1966 (1972); Associate Professor of Forest Economics; Chairman, Forest Management and Social Sciences; B.S.F., 1962, Purdue; M.F., 1963, M.A., 1965, Ph.D., 1966, Washington

WAGGONER, ALAN P., 1971 (1973), Research Assistant Professor of Civil Engineering; B.S., 1963, M.S., 1965, Ph.D., 1971, Washington

WAGGONER, LINDA L., 1972, Instructor in Physiological Nursing; B.S., 1970, Colorado; M.N., 1972, Washington

WAGNER, LOUIS C.,\* 1947 (1955), Professor of Marketing; B.B.A., 1938, Washington; M.A., 1940, Minnesota

WAGNER, NATHANIEL N.,\* 1962 (1970), Professor of Psychology and Obstetrics and Gynecology; B.A., 1951, Long Island; M.A., 1952, Ph.D., 1956, Columbia

WAGONER, DAVID R.,\* 1954 (1966), Professor of English; B.A., 1947, Pennsylvania State; M.A., 1949, Indiana

WAHL, PATRICIA W.,\* 1971 (1973), Assistant Professor of Biostatistics; B.A., 1960, San Jose State; Ph.D., 1971; Washington

WAIBLER, PAUL JOHN,\* 1954 (1961), Professor of Mechanical Engineering; B.S. in M.E., 1943, Kansas State; M.S. in M.E., 1944, Yale; Ph.D., 1958, Illinois

WALIKE, BARBARA C.,\* 1971, Assistant Professor of Physiological Nursing and Physiology and Biophysics; B.S., 1964, M.S., 1965, California (Los Angeles); Ph.D., 1971, Washington WALKER, JOAN M., 1971, Research Associate in Biostatistics; B.A., 1966, Seattle University; M.S., 1971, Washington

WALKER, LAUREN M.,\* 1946 (1957), Professor of Accounting; B.A., 1939, M.B.A., 1943, Washington; C.P.A., 1943, State of Washington

WALKER, RICHARD B.,\* 1948 (1960), Professor of Botany; B.S., 1938, Illinois; Ph.D., 1948, California (Berkeley)

WALLACE, J. FINDLAY, 1968 (1972), Associate Professor of Medicine; A.B., 1957, M.D., 1961, Washington (St. Louis)

WALLACE, JOHN M.,\* 1966 (1970), Associate Professor of Atmospheric Sciences; Adjunct Associate Professor of Environmental Studies; B.S., 1962, Webb Institute of Naval Architecture; Ph.D., 1966, Massachusetts Institute of Technology

WALLERSTEIN, GEORGE,\* 1965, Professor of Astronomy; B.A., 1951, Brown; Ph.D., 1957, California Institute of Technology

WALSH, JOHN J., 1969 (1970), Research Assistant Professor of Oceanography; B.S., 1964, Harvard; M.S., 1968, Ph.D., 1969, Miami

WALSH, KENNETH A.,\* 1959 (1969), Professor of Biochemistry; B.S., 1951, McGill; M.S., 1953, Purdue; Ph.D., 1959, Toronto

WALTZ, V. MARYANN,\* 1967, Lecturer in Physical Education; B.A., 1944, Washington; M.A., 1945, New York University

WANG, CHAO-NAN ,HO, 1970, Lecturer in Chinese; B.A., 1938, Peking

WANG, CHING-HSIEN,\* 1971, Assistant Professor of Chinese, Comparative Literature, and East Asian Studies; B.A., 1963, Tunghai; M.A., 1969, Ph.D., 1971, California (Berkeley)

WANG, SAN-PIN,\* 1961 (1970), Professor of Pathobiology; M.S., 1944, D.Med.Sci., 1959, Keio University, Tokyo; M.P.H., 1952, Michigan

WARD, ARTHUR A., JR., 1948 (1955), Professor and Chairman of Neurological Surgery; B.A., 1938, M.D., 1942, Yale

WARD, RICHARD J., 1963 (1972), Professor of Anesthesiology; M.D., 1949, St. Louis

WARE, ALMA M.,\* 1968, Assistant Professor of Physiological Nursing; Diploma, 1948, Mercy Hospital School of Nursing, Des Moines, Iowa; B.A., 1952, State University of Iowa; M.N., 1960, Washington

WARFIELD, ROBERT B.,\* 1968 (1971), Associate Professor of Mathematics; B.A., 1962, Haverford; Ph.D., 1967, Harvard

WARNER, GARTH WILLIAM, JR.,\* 1966 (1973), Professor of Mathematics; B.S., 1962, Arizona; Ph.D., 1966, Michigan

WARNICK, MYRON E.,\* 1956 (1965), Associate Professor of Restorative Dentistry; D.D.S., 1955, Alberta

WARNKE, FRANK JOSEPH,\* 1961 (1963), Professor of English and Comparative Literature; Director, Comparative Literature; A.B., 1948, Yale; M.A., 1951, Ph.D., 1954, Columbia

WARREN, CHARLES GERALD,\* 1968 (1972), Assistant Professor of Rehabilitation Medicine; B.S., 1964, M.P.A., 1971, Washington

WARREN, REED P., 1973, Research Associate in Medicine; A.S., 1964, Carbon; B.S., 1968, Ph.D., 1973, Utah

WASHBURN, A. LINCOLN,\* 1966, Professor of Geological Sciences; Adjunct Professor of Geophysics; B.A., 1935, Dartmouth; Ph.D., 1942, Yale WATENPAUGH, KEITH D., 1966 (1972), Research Assistant Professor of Biological Structure; B.S., 1962, Idaho; Ph.D., 1966, Montana State

WATSON, EILEEN L., 1970 (1972), Research Associate in Pharmacology and Oral Biology; B.S., 1963, Rutgers; Ph.D., 1970, Utah

WATSON, JAMES B.,\* 1955, Professor of Anthropology; A.B., 1941, A.M., 1945, Ph.D., 1948, Chicago

WAUGH, DANIEL C.,\* 1972 (1973), Assistant Professor of History and Russian and East European Studies; B.A., 1963, Yale; A.M., 1965, Ph.D., 1972, Harvard

WEAVER, JAMES D., 1970 (1973), Assistant Professor of Restorative Dentistry; D.D.S., 1965, Ohio State

WEAVER, KEITH ALLAN, 1973, Research Associate in Radiology; B.S., 1968, Missouri, M.S., 1969, Ph.D., 1972, Wisconsin

WEBB, EUGENE,\* 1966 (1970), Associate Professor of English; Chairman, Religious Studies; B.A., 1960, California (Los Angeles); M.A., 1962, Ph.D., 1965, Columbia

WEBB, GLENN,\* 1966 (1970), Associate Professor of Art History and East Asian Studies; B.A., 1957, Abilene Christian; M.F.A., 1959, Ph.D., 1970, Chicago

WEBBER, JOAN, 1972 (1973), Professor of English; B.A., 1951, Barnard; M.A., 1952, Rochester; Ph.D., 1959, Wisconsin

WEBER, BRUCE A.,\* 1968 (1971), Associate Professor of Speech; B.A., 1959, Concordia; M.S., 1961, Pennsylvania State; Ph.D., 1966, Illinois

WEBSTER, DONALD H., 1939 (1968), Professor Emeritus of Political Science; B.A., 1929, LL.B., 1931, Ph.D., 1933, Washington

WEBSTER, JOHN M., 1972, Acting Assistant Professor of English; B.A., 1966, M.A., 1969, California (Berkeley)

WEDGWOOD, RALPH J., 1962 (1972), Professor of Pediatrics; Head, Division of Immunology; M.D., 1947, Harvard

WEINKE, KAREN A., 1972, Instructor in Biological Structure; B.S., 1963, M.S., 1966, Wisconsin; Ph.D., 1972, Washington

WEINSTEIN, BORIS,\* 1967 (1969), Associate Professor of Chemistry; B.S., 1951, Louisiana; M.S., 1953, Purdue; Ph.D., 1959, Ohio State

WEINSTEIN, PHILIP, 1971 (1972), Research Assistant Professor of Dentistry; Research Instructor in Medicine and Office of Research in Medical Education; B.A., 1967, Queens; M.A., 1968, Ph.D., 1971, Kentucky

WEIS, JOSEPH HERMAN, 1972 (1974), Assistant Professor of Physics; B.S., 1964, California Institute of Technology; Ph.D., 1970, California (Berkeley)

WEISBROD, ALAN RICHARD, 1970, Assistant Professor of Forest Resources; B.A., 1959, Minnesota; M.S., 1965, Ph.D., 1970, Cornell

WEISER, RUSSELL S.,\* 1934 (1949), Professor of Microbiology (Immunology); B.S., 1930, M.S., 1931, North Dakota State; Ph.D., 1934, Washington

WEISS, NOEL S., 1973, Assistant Professor of Epidemiology and International Health, A.B., 1965, M.D., 1967, Stanford; M.P.H., 1969, D.P.H., 1971, Harvard

WEITKAMP, WILLIAM G., 1964 (1972), Research Associate Professor of Physics; Technical Director, Nuclear Physics Laboratory; B.A.,



1956, St. Olaf; M.S., 1961, Ph.D., 1964, Wisconsin

WELANDER, ARTHUR DONOVAN,\* 1937 (1958), Professor of Fisheries; B.S., 1934, M.S., 1940, Ph.D., 1946, Washington

WELANDER, PIERRE LOUIS R., 1973, Professor of Oceanography; B.S., 1948, Ph.D., 1954, University of Stockholm

WELCH, EUGENE BRUMMER,\* 1968 (1970), Associate Professor of Applied Biology in Civil Engineering; Adjunct Associate Professor of Environmental Studies; B.S., 1958, M.S., 1959, Michigan State; Ph.D., 1967, Washington

WELKE, WALTER CARL, 1929 (1969), Professor of Music; B.M., 1927, Michigan

WELLER, BRUCE C., 1968, Assistant Professor of Social Work; A.B., 1950, M.S.W., 1957, Washington

WELLS, NORMA J., 1960 (1970), Assistant Professor of Dental Hygiene; B.S., R.D.H., 1958, Washington; M.P.H., 1966, California (Los Angeles)

WELMAN, VALENTINE,\* 1954 (1962), Associate Professor of Art; B.F.A., 1952, Denver; M.F.A., 1954, Colorado

WENK, EDWARD, JR.,\* 1970 (1973), Professor of Engineering and Public Affairs; Director, Program in Social Management of Technology; B.E., 1940, Johns Hopkins; M.Sc., 1947, Harvard; Dr., Eng., 1950, Johns Hopkins

WENNBERG, RICHARD P., 1969 (1971), Assistant Professor of Pediatrics; B.S., 1958, Stanford; M.D., 1962, Washington

WENNER, WALDEMAR H., 1968, Assistant Professor of Pediatrics; B.A., 1954, St. John's; M.D., 1958, Minnesota

WERGEDAL, JON E., 1962, (1971), Research Assistant Professor of Medicine; B.A., 1958, St. Olaf; M.S., 1960, Ph.D., 1962, Wisconsin

WERNER, AUGUST HANSEN, 1931 (1932), Professor Emeritus of Music; B.S., 1913, College of Agriculture (Stend, Norway); Graduate, 1924, Master School of Music (New York)

WERNER, JOANNE, 1972, Instructor in Family and Community Nursing; B.S.N., 1968, Duke; M.S., 1972, Colorado

WESNER, ELENORA M., 1924 (1950), Assistant Professor Emeritus of German; B.Ped., 1909, Colorado State Normal School; A.B., 1915, Chicago; M.A., 1923, Northwestern

WESSMAN, HAROLD EVERETT, 1948 (1969), Dean Emeritus of Engineering; B.S., 1924, M.S., 1925, C.E., 1929, Ph.D., 1936, Illinois

WEST, JAMES D.,\* 1972, Associate Professor of Russian Language and Literature and Russian and East European Studies; M.A., 1966, Ph.D., 1969, Cambridge

WEST, ROGER A., 1972, Assistant Professor of Oral Surgery; B.S., 1963, Montana; D.M.D., 1968, Oregon

WESTLAND, WENDAL A., 1973, Instructor in Dental Hygiene; B.S., 1972, Washington

WESTRUM, LESNICK E.,\* 1966 (1973), Associate Professor of Biological Structure and Neurological Surgery; B.S., 1958, Washington State; M.D., 1963, Washington; Ph.D., 1966, University College (London)

WESTWATER, MICHAEL JOHN,\* 1970 (1973), Associate Professor of Mathematics; B.A., 1962, Ph.D., 1967, Cambridge (England)

WEYBRIGHT, MYRON D.,\* 1966 (1971), Assistant Professor of Speech; B.A., 1959, Manchester; M.F.A., 1962, Ohio; Ph.D., 1971, Northwestern WHEATLEY, JOHN J.,\* 1960 (1962), Associate Professor of Marketing; S.B., 1947, Harvard; M.B.A., 1954, Ph.D., 1959, Buffalo

. .

WHEELER, HARRY E.,\* 1948 (1951), Professor of Geological Sciences; B.S., 1930, Oregon; M.A., 1932, Ph.D., 1935, Stanford

WHERRETTE, WILLIAM C.,\* 1948 (1960), Associate Professor of Architecture; B.Arch. 1948, Carnegie Institute of Technology; M.U.P., 1959, Washington

WHETTEN, JOHN T.,\* 1963 (1972), Professor and Chairman of Geological Sciences; Adjunct Professor of Oceanography; A.B., 1957, Princeton; M.A., 1959, California (Berkeley); Ph.D., 1962, Princeton

WHISLER, HOWARD C.,\* 1963 (1973), Professor of Botany; B.S., 1954, Ph.D., 1960, California (Berkeley)

WHITE, JOAN, 1969, Lecturer in Drama

WHITE, MYRON L., 1950 (1967), Associate Professor and Chairman of Humanistic-Social Studies; B.A., 1943, Ph.D., 1958, Washington

WHITELEY, ARTHUR H.,\* 1947 (1959), Professor of Zoology; B.A., 1938, Kalamazoo; M.A., 1939, Wisconsin; Ph.D., 1945, Princeton

WHITELEY, HELEN R.,\* 1953 (1966), Professor of Microbiology; B.A., 1942, California; M.A., 1945, Texas; Ph.D., 1951, Washington

WHITNEY, BARBARA L., 1973, Acting Assistant Professor of Geological Sciences; A.B., 1964, Vassar; M.S., 1969, Colorado

WHITNEY, RICHARD RALPH,\* 1967 (1973), Professor of Fisheries; Unit Leader, Washington Cooperative Fishery Unit; B.A., 1949, M.S., 1951, Utah; Ph.D., 1955, Iowa State

WHITTAKER, JAMES K.,\* 1970, Associate Professor of Social Work; A.B., 1964, Boston College; M.S.W., 1966, Michigan; Ph.D., 1970, Minnesota

WHITTEMORE, OSGOOD J., JR.,\* 1964 (1969), Professor of Ceramic Engineering; B.S. in Cer.E., 1940, Iowa State; M.S. in Cer.E., 1941, Washington; Cer.E. (Professional), 1950, Iowa State

WHORTON, JAMES C.,\* 1970, Instructor; in Biomedical History; B.S., 1964, Duke; Ph.D., 1969, Wisconsin

WICKMAN, JAMES A.,\* 1956 (1962), Associate Professor of Risk Control and Insurance; B.S., 1953, M.B.A., 1954, Ph.D., 1961, Washington

WIEDERHIELM, CURT A. R.,\* 1961 (1970), Professor of Physiology and Biophysics; Karolinska Institute; Ph.D., 1960, Washington

WIEGENSTEIN, LOUISE, 1953 (1972), Assistant Professor of Pathology; B.S., 1938, Simmons; M.D., 1946, Tufts

WIEGERT, H. THOMAS, 1973, Assistant Professor of Family Medicine; M.D., 1955, Washington

WIKE, GENE E.,\* 1971, Assistant Professor of Communications; B.A., 1955, Washington State

WILETS, LAWRENCE,\* 1958 (1962), Professor of Physics; B.S., 1948, Wisconsin; M.A., 1950, Ph.D., 1952, Princeton

WILHELM, HELLMUT, 1948 (1953), Professor Emeritus of Chinese; Referendar, 1928, Frankfurt; Diploma, 1930, School of Oriental Studies, Berlin; Ph.D., 1932, Berlin

WILKIE, FRANCES; 1973, Research Assistant Professor of Psychiatry and Behavioral Sciences; B.A., 1958, Duke; M.A., 1959, Mississippi

WILKUS, ROBERT J., 1970 (1972), Assistant Professor of Laboratory Medicine and Medicine; Director, Division of Electroencephalography and Neurophysiology, Harborview Medical Center; B.S., 1958, M.S., M.D., 1962, Loyola

WILLARD, H. ROBERT, 1971, Research Associate in Electrical Engineering; B.S., 1955, M.S., 1957, Ph.D., 1971, Washington

WILLEFORD, WILLIAM OTIS, JR.,\* 1967 (1970), Associate Professor of English and Comparative Literature; B.A., 1950, M.A., 1953, California (Berkeley); Diploma, 1962, C. G. Jung Institute (Zurich); Ph.D., 1966, Zurich

WILLEY, ROBERT L., 1972, Assistant Professor of Restorative Dentistry; D.D.S., 1955, Washington

WILLIAMS, DAVID L., 1971, Research Associate in Radiology; B.S., 1965, Washington

WILLIAMS, DONALD T.,\* 1969 (1972), Associate Professor of Education; B.A., 1950, Eastern Washington State; M.A., 1957, Ph.D., 1963, Stanford

WILLIAMS, NANCY M., 1972 (1973), Assistant Professor of Anthropology; B.A., 1950, Stanford; M.A., 1969, Ph.D., 1973, California (Berkeley)

WILLIAMS, REG A., 1973, Instructor in Psychosocial Nursing; A.S., 1964, Carbon; B.S., 1968, Utah; M.N., 1972, Washington

WILLIAMS, ROBERT H., 1948, Professor of Medicine; A.B., 1929, Washington and Lee; M.D., 1934, Johns Hopkins

WILLIAMS, ROBERT WALTER,\* 1959 (1960), Professor of Physics; A.B., 1941, Stanford; M.A., 1943, Princeton; Ph.D., 1948, Massachusetts Institute of Technology

WILLIAMS, WALTER,\* 1970, Professor of Public Affairs; Director of Research, Institute of Governmental Research; B.B.A., 1955, M.B.A., 1956, Texas (Austin); Ph.D., 1960, Indiana

WILLIS, LEOTA SNIDER, 1943 (1972), Lecturer Emeritus in English; B.A., 1923, California; M.A., 1930, Ph.D., 1931, Pennsylvania; Cert. of Studies, 1932, Sorbonne

WILLOWS, A. O. DENNIS,\* 1969 (1972), Associate Professor of Zoology; Director, Fridaý Harbor Laboratories; B.S., 1963, Yale; Ph.D., 1967, Oregon

WILLS, ROBERT E., 1968 (1971), Assistant Professor of Medicine; M.D., 1958, Michigan

WILLS, ROLAND C., 1972, Assistant Professor of Restorative Dentistry; D.D.S., 1951, Washington

WILLSON, RICHARD A., 1973, Assistant Professor of Medicine; B.A., 1958, M.D., 1962, Minnesota

WILSING, WESTON C., 1953 (1960), Associate Professor; Director, Seminars, Graduate School of Business Administration; B.Ed., 1943, M.A., 1946, D.B.A., 1959, Washington

WILSON, CLOTILDE M.,\* 1929 (1961); Associate Professor of French Language and Literature; B.A., 1926, M.A., 1927, Ph.D., 1931, Washington

WILSON, ROBERT, 1970 (1974), Lecturer in Music; B.A., 1961, M.A., 1965, Chicago

WILSON, RUTH M.,\* 1936 (1966), Professor of Physical Education; B.S., 1931, Utah; M.S., 1936, Wisconsin

WILSON, WESLEY R.,\* 1969, Assistant Professor of Speech; B.A., 1958, M.A., 1961, Redlands; Ph.D., 1969, Washington

WILTZ, NICHOLAS A., 1969, Instructor in Pediatrics; Adjunct Professor of Psychology; B.S., 1958, Oregon State; M.Ed., 1963, Ph.D., 1969, Oregon WINANS, EDGAR V.,\* 1965 (1966), Professor of Anthropology and African Studiés; B.A., 1952, M.A., 1954, Ph.D., 1959, California (Los Angeles)

WINN, SHARON A., 1972, Research Associate in Health Services; B.A., 1965, Wisconsin; M.P.A., 1972, Washington

WINTER, DONALD F., 1970 (1973), Associate Professor of Oceanography; B:A., 1954, Amherst; M.S., 1959, Ph.D., 1962, Harvard

WINTER, PETER M., 1969, Associate Professor of Anesthesiology; A.B., 1958, Cornell; M.D., 1962, Rochester

WINTERS, NANCY J., 1973, Instructor in Maternal and Child Nursing; B.S., 1970, St. Olaf; M.N., 1973, Washington

WINTERSCHEID, LOREN C.,\* 1958 (1972), Professor of Surgery; Medical Director, University Hospital; B.A., 1948, Willamette; Ph.D., 1953,,Pennsylvania; M.D., 1954, Pennsylvania

WISE, JOHN A., 1972, Assistant Professor of Pathobiology; B.A., B.S., 1963, Washington; M.S., 1967, Minnesota; Ph.D., 1970, Oregon State

WISSMAR, ROBERT CHARLES, 1972, Research Associate in Fisheries; B.S., 1965, Utah; M.S., 1968, Ph.D., 1972, Idaho

WITT, JOSEPH A., 1968 (1973), Research Assistant Professor; Curator, Arboretum; B.S., 1943, M.S., 1947, Washington State

WOLAK, JAN,\* 1965 (1969), Associate Professor of Mechanical Engineering; B.Sc., 1950, Woolwich Polytechnic, University of London; M.S., 1960, Washington (St. Louis); Ph.D., 1965, California (Berkeley)

WOLCOTT, JOHN R.,\* 1967, Assistant Professor of Drama; B.F.A., 1964, Carnegie Institute of Technology; Ph.D., 1967, Ohio State

WOLF, NORMAN S.,\* 1968 (1972), Associate Professor of Pathology; B.S., D.V.M., 1953, Kansas State; Ph.D., 1960, Northwestern

WOLF, VIVIAN C.,\* 1969, Assistant Professor of Physiological Nursing; Diploma, 1960, Presbyterian St. Luke's School of Nursing; B.S.N., 1960, North Central (Illinois;) M.A., 1964, Ph.D., 1969, Chicago

WOLFE, MYER R.,\* 1949 (1958), Professor of Urban Planning; B.S., 1940, New Hampshire; M.R.P., 1947, Cornell

WOLFLE, DAEL L.,\* 1970, Professor of Public Affairs and Psychology; B.S., 1927, M.A., 1928, Washington; Ph.D., 1931, Ohio State

WOLTERS, M. ERIC, 1972, Lecturer in Public Affairs; Assistant Dean, Graduate School of Public Affairs; B.A., 1966, M.P.A., 1967, Washington

WOMACK, WILLIAM M., 1969 (1971), Assistant Professor of Psychiatry and Behavioral Sciences; B.A., 1957, Lincoln (Pennsylvania); M.D., 1961, Virginia

WONG, KUANG C., 1970, Assistant Professor of Anesthesiology and Pharmacology; B.S., 1959, Iowa State; M.S., 1962, Iowa; Ph.D., 1966, M.D., 1968, Nebraska

WOOD, FRANCIS C., JR., 1960 (1968), Associate Professor of Medicine; A.B., 1950, Princeton; M.D., 1954, Harvard

WOODBURNE, LLOYD S.,\* 1950, Professor of Psychology; A.B., 1929, M.A., 1930, Ph.D., 1932, Michigan WOODCOCK, EDITH, 1930 (1945), Associate Professor Emeritus of Music; B.M., 1936, Washington

. .

WOODMAN, DARRELL JAMES,\* 1965 (1970), Associate Professor of Chemistry; B.A., 1960, Reed; M.A., Ph.D., 1965, Harvard

WOODRUFF, GENE L.,\* 1965 (1970), Associate Professor of Nuclear Engineering; Director, Nuclear. Engineering Laboratories; B.S., 1956, United States Naval Academy; M.S., 1963, Ph.D., 1966, Massachusetts Institute of Technology

WOODRUM, DAVID E., 1971, Assistant Professor of Pediatrics; Director, Pediatric Pulmonary Disease, Children's Orthopedic Hospital and Medical Center; A.B., 1961, MacMurray; M.D., 1965, Illinois

WOODS, MARCELLA D.,\* 1970 (1971), Assistant Professor of Physical Education; B.S., 1955, Illinois State; M.Ed., 1959, North Carolina; Ph.D., 1966, Ohio State

WOODS, STEPHEN C.,\* 1972, Assistant Professor of Psychology; Adjunct Assistant Professor of Medicine; B.S. (Zoology), 1965, (Psychology), 1966, Ph.D., 1970, Washington

WOODSON, ROBERT D., 1967 (1971), Assistant Professor of Medicine; A.B., 1959, Houghton; M.D., 1963, Chicago

WOODWORTH, ROBERT T.,\* 1961 (1966), Associate Professor of Management and Organization; B.S., 1952, Indiana; M.B.A., 1956, Ph.D., 1963, Northwestern

WOOLDRIDGE, DAVID DILLEY,\* 1968 (1969), Associate Professor of Forest Hydrology; B.S.F., 1950, Ph.D., 1961, Washington

WOOTTON, PETER,\* 1959 (1972), Professor of Radiology; B.S. (Hon.), 1944, Birmingham (England)

WORCESTER, DEAN A.,\* 1946 (1966), Professor of Economics; A.B., 1939, M.A., 1940, Nebraska; Ph.D., 1943, Minnesota

WORSLEY, THOMAS R., 1970 (1973), Research Assistant Professor of Oceanography; B.S., 1965, City College, New York; M.S., 1967, Tennessee

WORTHINGTON, BONNIE SUE,\* 1971, Assistant Professor of Home Economics; B.S., 1965, M.S., 1967, Ph.D., 1971, Washington

WORTHY, ELIZABETH J.,\* 1966 (1970), Assistant Professor of Maternal and Child Nursing; Diploma, 1940, Kings College Hospital, London, England; Diploma in Nursing Education, 1946, London University; B.N., 1954, McGill; M.N., 1964, Washington

WORTLEY, W. VICTOR,\* 1965, Assistant Professor of French Language and Literature; B.A., 1959, M.A., 1961, Ph.D., 1964, Oregon

WRIGHT, LANITA S., 1968, Instructor in Pediatrics; B.A., 1958, John Brown; M.D., 1962, Temple

WYLIE, TURRELL VERL,\* 1958 (1968), Professor of Tibetan, Comparative Literature, and East and Inner Asian Studies; B.A., 1952, Ph.D., 1958, Washington

YAGGY, ELINOR MAY, 1943 (1969), Associate Professor of English; B.A., 1929, M.A., 1939, Idaho; Ph.D., 1946, Washington YAMAMURA, KOZO,\* 1970 (1972), Professor of East Asian Studies, Institute for Comparative and Foreign Area Studies; Adjunct Professor of Economics; B.A., 1957, California (Berkeley); Ph.D., 1963, Northwestern

YANTIS, PHILLIP A.,\* 1965 (1969), Professor of Speech; Director, Program in Speech Pathology and Audiology; B.A., 1950, M.A., 1952, Ph.D., 1955, Washington

YATES, WILLIAM G., 1970, Instructor in Surgery; B.S., 1960, M.S., 1961, Ph.D., 1970, Stanford

YEE, SINCLAIR S.,\* 1966 (1970), Associate Professor of Electrical Engineering; B.S., 1959, M.S., 1961, Ph.D., 1965, California (Berkeley)

YEN, ISABELLA YIYUN,\* 1960 (1961), Associate Professor of Chinese and East Asian Studies; B.A., 1938, Peking; A.M., 1951, Michigan; Ph.D., 1956, Cornell

YERINA, YVONNE VIDA-MARIA, 1970, Instructor in Home Economics; B.S., 1964, Michigan State; M.S., 1970, Wisconsin

YERXA, FENDALL W.,\* 1965, Professor of Communications; A.B., 1936, Hamilton

YOUNG, ALLAN C.,\* 1949 (1960), Professor of Physiology and Biophysics; B.A., 1930, M.A., 1932, British Columbia; Ph.D., 1934, Toronto

YOUNG, ELTON T. III,\* 1969, Assistant Professor of Biochemistry; Adjunct Assistant Professor of Genetics; B.A., 1962, Colorado; Ph.D., 1967, California Institute of Technology

YOUNG, KENNETH K.,\* 1967 (1970), Associate Professor of Physics; B.S., 1959, Washington; Ph.D., 1965, Pennsylvania

YOUNGMANN, CARL E.,\* 1973, Assistant Professor of Geography; A.B., 1965, Midland; M.A., 1968, Ph.D., 1972, Kansas

YUODELIS, RALPH A.,\* 1963 (1971), Professor of Restorative Dentistry; D.D.S., 1955, Alberta; M.S.D., 1963, Washington

# Z

ZARINA, ASTRA, 1970 (1973), Associate Professor of Architecture; B.Arch., 1953, Washington; M.Arch., 1954, Massachusetts Institute of Technology

ZARO, JOAN S., 1971, Assistant Professor of Psychology; B.A., 1966, Stanford; M.A., 1969, Ph.D., 1971, Connecticut

ZASOSKI, ROBERT J., 1973, Assistant Professor of Forest Soils; B.S., 1967, M.S., 1970, Ph.D., 1973, California (Davis)

ZETLIN, EMANUEL ROMAN, 1947, Professor Emeritus of Music; B.A., 1916, Imperial Conservatory (Petrograd); Dr.Mus. (Hon.), 1936, Washington (D.C.). College of Music

ZIADEH, FARHAT J.,\* 1966, Professor and Chairman of Near Eastern Languages and Literature and Near Eastern Studies; B.A., 1937, American University of Beirut; LL.B., 1940, London; Barrister-at-Law, 1946, Lincoln's Inn (London)

ZIEMANN, MICHAEL J., 1973, Acting Assistant Professor of Germanic Languages and Literature; B.A., 1968, McPherson; M.A., 1969, Kansas State

ZILLMAN, LAWRENCE JOHN, 1928 (1953), Professor Emeritus of English; B.A., 1928, Ph.D., 1936, Washington



ZIMMERMANN, TIMM A., 1964 (1972), Assistant Professor of Medicine; B.S., 1957, Ferris State; M.D., 1963, Wisconsin

ZINSER, ELISABETH A., 1972, Research Instructor in Medicine and Office of Research in Medical Education; B.S., 1964, Stanford; M.S., 1966, Ph.D., 1972, California ZORN, MARK B., 1969 (1971), Instructor in Ophthalmology; B.S., 1958, Rensselaer Polytechnic Institute; Ph.D., 1968, Columbia

ZSIGMONDY-LIEDEMANN, DENES, 1972 (1973), Professor of Music; Baccalaureate, 1940, Gymnasium, Budapest; Liszt-Academy, Budapest; Masterclass, 1943, Budapest ZUBERBUHLER, DOUGLAS R., 1968 (1971), Assistant Professor of Architecture; B.Arch., 1967, Idaho; M.Arch., 1968, Washington

ZUCKERMAN, HELEN C., 1952 (1973), Lecturer Emeritus in Mathematics; B.S., 1930, M.S., 1935, Washington



# **EXPLANATION OF ABBREVIATIONS**

Listed below are abbreviations that are frequently associated with references to academic administrative units or that are used as course number prefixes. Following each abbreviation is an explanation, the name of the department or other subordinate administrative unit responsible for the abbreviation, and the parent school, college, or other major administrative unit.

A A:	Aeronautics and Astronautics (Engineering) Accounting (Business Administration)	CSENG:	Continuing Studies—Engineering (Continuing Studies)
ADMIN:	Administration (Business Administration)	C51155.	Studies)
AKKAD:	Akkadian, Near Eastern Languages and Literature	CSIE:	Continuing Studies—Industrial Engineering (Continuing
ANEST:	Anesthesiology (Medicine)	CSME:	Continuing Studies—Mechanical Engineering (Continuing
ANTH: A ORG:	Anthropology, Anthropology (Arts and Sciences) Administrative Theory and Organizational Behavior	CSMET:	Continuing Studies—Metallurgical Engineering (Continuing
ARAB:	(Business Administration) Arabic, Near Eastern Languages and Literature	CSMIN:	Studies) Continuing Studies—Mining Engineering (Continuing
ARAM:	(Arts and Sciences) Aramaic, Near Eastern Languages and Literature	CSNE:	Studies) Continuing Studies—Nuclear Engineering (Continuing
ARCH	(Arts and Sciences) Architecture (Architecture and Urban Planning)	CSREH	Studies; Continuing Studies—Rehabilitation Medicine (Continuing
ARCHY:	Archaeology, Anthropology (Arts and Sciences)	CORDII.	Studies)
ART: ART H:	Art, Art (Arts and Sciences) Art History, Art (Arts and Sciences)	CZECH:	Czech, Slavic Languages and Literature (Arts and Sciences)
AS:	Aerospace Studies (Reserve Officer Training Programs)	DAN:	Danish, Scandinavian Languages and Literature (Arts and
ASIAN:	Asian Languages and Literature, Asian Languages and		Sciences)
ASTR	Astronomy, Astronomy (Arts and Sciences)	D ART:	Drama Arts (Interdisciplinary Graduate Programs)
ATM S:	Atmospheric Sciences, Atmospheric Sciences (Arts and	DENT: DHYG	Dental Hygiene (Dentistry)
	Sciences)	DRAMA:	Drama, Drama (Arts and Sciences)
- 		DRDNC:	Drama Dance, Dance (Arts and Sciences)
BA:	Business Administration (Business Administration)		
BA KM: B CMU	Research Methods (Business Administration) Business Communications (Business Administration)	EASIA:	East Asia, Institute for Comparative and Foreign Area
B CON:	Building Construction (Architecture and Urban Planning)	FCON	Studies (Arts and Sciences)
B ECN:	Business Economics (Business Administration)	ECON:	Economics, Economics (Aris and Sciences)
BG&S:	Business, Government, and Society (Business Administration)	EDADM: EDC&I	Educational Curriculum and Instruction (Education)
BIOC:	Biochemistry (Medicine)	EDEPS:	Educational Policy Studies (Education)
BIOEN:	Bioengineering (Interschool or Intercollege Programs)	EDHED:	Higher Education (Education)
BI HS:	Biomedical History (Medicine)	EDPSY:	Educational Psychology (Education)
BIOL:	Biology, Biology (Arts and Sciences)	EDSPE:	Special Education (Education)
BLA 5; BMATU	Biomethematics (Interdisciplinary Graduate Programs)	EDUC:	Independent Study, Research, and Field Experience
BOT:	Botany, Botany (Arts and Sciences)	<b>T E</b> .	(Teaching Practicum) (Education)
B POL:	Business Policy (Business Administration)	E E:	Electrical Engineering (Engineering)
B STR:	Biological Structure (Medicine)	ENGL:	English (Arts and Sciences)
BULGR:	Bulgarian, Slavic Languages and Literature (Arts and	ENGR:	Engineering, College Courses (Engineering)
	Sciences)	ENV S:	Institute for Environmental Studies
CATA:	Catalan, Romance Languages and Literature (Arts and	FAMED	Family Medicine (Medicine)
	Sciences)	FD SC	Food Science (Fisheries)
CER E:	Ceramic Engineering (Engineering)	FIN:	Finance (Business Administration)
CESM:	Structural Engineering and Engineering Mechanics, Civil	FINN:	Finnish, Scandinavian Languages and Literature (Arts and
CETC	Transportation Construction and Geotechnical		Sciences)
CLIC.	Engineering: Civil Engineering (Engineering)	FISH:	Fisheries (Fisheries)
CEWA:	Water and Air Resources, Civil Engineering (Engineering)	FOR K:	Forest Resources (Forest Resources)
CH E:	Chemical Engineering (Engineering)	PREN.	Sciences)
CHEM:	Chemistry, Chemistry (Arts and Sciences)		
CHIN:	Chinese, Asian Languages and Literature (Arts and Sciences)	GENET:	Genetics, Genetics (Arts and Sciences)
CIVE:	Classical Archaeology Classics (Arts and Sciences)	GEOG:	Geography, Geography (Arts and Sciences)
CLAR.	Classical Archaeology, Classica (Arts and Sciences)	GEOL:	Geological Sciences, Geological Sciences (Arts and Sciences)
C LIT:	Comparative Literature, Comparative Literature (Arts and	GERM:	Germanic Languages and Literature, Germanic Languages and Literature (Arts and Sciences)
	Sciences)	GIS:	General and Interdisciplinary Studies, General and
CL LI:	Classical Linguistics, Classics (Arts and Sciences)		Interdisciplinary Studies (Arts and Sciences)
CMU:	Communications, Communications (Arts and Sciences)	GPHYS:	Geophysics, Geophysics (Arts and Sciences)
CONJ:	Conjoint (Medicine)	GRK:	Greek, Classics (Arts and Sciences)
C PHY:	Comparative Physiology (Interdisciplinary Graduate	G ST:	General Studies, General and Interdisciplinary Studies
CEA	Programs) Continuing Studies Aeronautics and Astronautics		(Arts and Sciences)
CONA:	(Continuing Studies)	HD UR:	Hindi-Urdu, Asian Languages and Literature (Arts and
CSCE:	Continuing Studies—Civil Engineering (Continuing Studies)		Sciences)
CSCER:	Continuing Studies—Ceramic Engineering (Continuing	HEBR:	Hebrew, Near Eastern Languages and Literature (Arts and Sciences)
CSCHE	Continuing Studies—Chémical Engineering (Continuing	H EC:	Home Economics, Home Economics (Arts and Sciences)
	Studies)	H ED:	Health Education, Physical and Health Education (Arts
C SCI:	Computer Science (Interdisciplinary Graduate Programs)		and Sciences)
CSEE:	Continuing Studies—Electrical Engineering (Continuing	HRSYS:	Human Resource Systems (Business Administration)
	Studies)	HST:	mistory, General, History (Arts and Sciences)

HSS: HSTAA: HSTAM: HSTAS: HSTEU: HUBIO:	Humanistic-Social Studies (Engineering) History of the Americas, History (Arts and Sciences) Ancient and Medieval History, History (Arts and Sciences) History of Asia, History (Arts and Sciences) Modern European History, History (Arts and Sciences) Human Biology (Medicine)	PÉRIO: PHARM: PHCOL: PHIL: PHSCI: PHY A:
HUM: HUNGR:	Humanities, Humanities (Arts and Sciences) Hungarian, Slavic Languages and Literature (Arts and Sciences)	PHYS: POL S: POLSH: PORT:
IASIA:	Inner Asia, Institute for Comparative and Foreign Area	
I BUS: ICEL:	Studies (Arts and Sciences) International Business (Business Administration) Icelandic, Scandinavian Languages and Literature (Arts	P PSY: PROS: PROV:
INDN: IMS:	and Sciences) Indian, Asian Languages and Literature (Arts and Sciences) Institute for Marine Studies (Interschool or	PRSAN:
IPHD:	Intercollege Programs) Individual Doctor of Philosophy Degree Program (Interdisciplinary Graduate Programs)	PSYCH: P T:
ITAL:	Italian, Romance Languages and Literature (Arts and Sciences)	QMETH: Q SCI: QUAT:
JAPAN:	Japan, Asian Languages and Literature (Arts and Sciences)	QUAL
KOR:	Korean, Asian Languages and Literature (Arts and Sciences)	RADGY: RAD S:
LA:	Liberal Arts	RECPL:
LAB M: L ARC: \ LAT:	Landscape Architecture (Architecture and Urban Planning) Latin, Classics (Arts and Sciences)	REEU:
LAW:	Law (Law) Librarianshin (Librarianshin)	REHAB:
LING:	Linguistics (Arts and Sciences)	R INS:
MATH:	Mathematics, Mathematics (Arts and Sciences)	KMN:
ME: MED: MED P:	Mechanical Engineering (Engineering) Medicine (Medicine) Medical Brootine (Medicine)	RÓM: ROMAN:
MED T:	Medical Technology (Medicine)	ROMN:
MET E: MICRO:	Metallurgical Engineering (Engineering) Microbiology, Microbiology (Arts and Sciences)	RUSS:
MICRO:	Microbiology (Medicine)	
MKTG:- MONG:	Marketing (Business Administration) Mongolian, Asian Languages and Literature (Arts and	SASIA:
M SCI: MUSAP	Sciences) Military Science (Reserve Officer Training Programs) Music Amplied Music (Arts and Sciences)	SCAND:
MUSIC:	Music, Music (Arts and Sciences)	
N E: NORW:	Near Eastern Languages and Literature (Arts and Sciences) Norwegian, Scandinavian Languages and Literature (Arts	SLAV:
NŔ:	and Sciences) Neurological Surgery (Medicine)	SLAVC:
N SCI: NUC E:	Naval Science (Reserve Officer Training Programs) Nuclear Engineering (Engineering)	SMT:
NURS:	Nursing (Nursing)	SNKRT:
OB GY: OCEAN:	Obstetrics and Gynecology (Medicine) Oceanography, Oceanography (Arts and Sciences)	SOC: SOC S:
ODTP:	Oral Diagnosis and Treatment Planning (Dentistry)	SOC W:
OPHTH:	Opthalmology (Medicine)	SPAN:
OPSYS: ORALB:	Oral Biology (Dentistry)	SPCH:
ORALM:	Oral Medicine (Dentistry) Orthodontics (Dentistry)	SURG:
ORTHP:	Orthopaedics (Medicine)	
OT: OTOL:	Occupational Therapy (Medicine) Occupational Therapy (Medicine) Otolaryngology (Medicine)	TAGL: TAMIL: THAI:
P AFR:	Public Affairs (Public Affairs)	TIB:
PB AD:	Public Administration (Public Affairs)	TKIC:
P BIO: PB PL:	Physiology and Biophysics (Medicine) Public Policy (Public Affairs)	TKISH:
PBSCI: PC:	Psychiatry and Behavioral Sciences Public Health and Community Medicine (Public Health	TRANS:
PC BS: PC EH:	and community Medicine) Biostatistics (Public Health and Community Medicine) Environmental Health (Public Health and Community	UCONJ: U D: UGAR:
PC EP:	Medicine) Epidemiology and International Health (Public Health and Community Medicine)	UKR:
PC HS; PC PB:	Health Services (Public Health and Community Medicine) Pathobiology (Public Health and Community Medicine)	URB P: UROL:
PEDNC	and Sciences) Dance, Physical and Health Education (Arts	WLFS:
PEDO: PEDS:	Pedodontics (Dentistry) Pediatrics (Medicine)	ZOOL:

RIO:	Periodontics (Dentistry)
IARM:	Pharmacy and Pharmacy Administration (Pharmacy)
HL:	Philosophy, Philosophy (Arts and Sciences)
ISCI:	Pharmaceutical Science (Pharmacy) Physical Anthropology (Arts and Sciences)
TYS:	Physics, Physics (Arts and Sciences)
DLS:	Political Science, Political Science (Arts and Sciences) Polish Stavic Languages and Literature (Arts and Sciences)
ORT:	Portuguese, Romance Languages and Literature (Arts and Sciences)
PSY:	Physiology Psychology (Interdisciplinary Graduate Programs)
ROS: ROV:	Prosthodontics (Dentistry) Provencal, Romance Languages and Literature (Arts and
RSAN:	Sciences) Persian, Near Eastern Languages and Literature (Arts and Science)
SYCH: T:	Psychology, Psychology (Arts and Sciences) Physical Therapy (Medicine)
METH: SCI: UAT:	Quantitative Methods (Business Administration) Quantitative Science (Interschool or Intercollege Programs) Quaternary Studies (Interdisciplinary Graduate Programs)
ADGY: AD S:	Radiology (Medicine) Radiological Sciences (Interdisciplinary Graduate
ECPL:	Recreation Planning and Administration, Physical and
EEU:	Russia and East Europe, Institute for Comparative and
EHAB:	Foreign Area Studies (Arts and Sciences) Rehabilitation Medicine (Medicine)
ES D:	Restorative Dentistry (Dentistry)
INS: MN:	Risk and Insruance (Business Administration) Romanian, Romance Languages and Literature (Arts and
ом:	Sciences) Romance Linguistics and Literature (Arts and Sciences)
OMAN:	Romance Languages and Literature, Romance Languages and Literature (Arts and Sciences)
UMN:	Romanian, Slavic Languages and Literature (Arts and Sciences)
055:	Russian, Slavic Languages and Literature (Arts and Sciences)
ASIA:	South Asia, Institute for Comparative and Foreign Area Studies (Arts and Sciences)
CAND:	Scandinavian, Scandinavian Languages and Literature (Arts
CND:	Sciences, Scandinavian Languages and Literature, Scandinavian
ER C:	Serbo-Croatian, Slavic Languages and Literatue (Arts and Sciences)
LAV: LAVC:	Slavic, Slavic Languages and Literature (Arts and Sciences) Slavic Languages and Literature, Slavic Languages and
MT:	Literature (Arts and Sciences) Social Management of Technology (Interschool or
NKRT:	Intercollege Programs) Sanskrit, Asian Languages and Literature (Arts and
OC:	Sciences) Sociology, Sociology (Arts and Sciences)
DC S:	Social Science, Social Science (Arts and Sciences)
DJU:	Society and Justice, Society and Justice (Arts and Sciences)
PAN:	Spanish, Romance Languages and Literature (Arts and Sciences)
PCH:	Speech, Spech (Arts and Sciences)
URG: WED:	Surgery (Medicine) Swedish, Scandinavian Languages and Literature (Arts and
	Sciences)
AGL:	Tagalog, Asian Languages and Literature (Arts and Sciences)
AMIL:	Tamil, Asian Languages and Literature (Arts and Sciences)
IB:	Tibetan, Asian Languages and Literature (Arts and Sciences) Tibetan, Asian Languages and Literature (Arts and
KIC:	Sciences) Turkic, Asian Languages and Literature (Arts and Sciences)
KISH:	Turkish, Near Eastern Languages and Literature (Arts and Sciences)
RANS:	Transportation (Business Administration)
CONJ:	University Conjoint (Interschool or Intercollege Programs)
GAR:	Ugaritic, Near Eastern Languages and Literature (Arts and
KR:	Sciences) Ukrainian, Slavic Languages and Literature
RB P	(Arts and Sciences) Urban Planning (Architecture and Urban Planning)
ROL:	Urology (Medicine)
LFS: OMEN:	Wildlife Science (Interschool or Intercollege Programs) Women Studies (Arts and Sciences)
001.:	Zoology, Zoology (Arts and Sciences)



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